JOURNAL OF THE IRON AND STEEL INSTITUTE

VOLUME 174 1953

SUBJECT INDEX

[References to papers and articles given in full text are indicated by the word (*Paper*) following the page number.

Indexing of Alloy Steels and Other Alloys: In the indexing of alloy steels, carbon and iron are ignored and the alloying elements contained in the steel are arranged in alphabetical order; for example, all references to nickel–chromium–molybdenum steel will be found under the heading chromium–molybdenum–nickel steel. In the indexing of other alloys, carbon and iron, when present, are included in the title; iron, when present, is always mentioned first and the other elements follow in alphabetical order, carbon being in all cases mentioned last. Examples: "Iron–silicon–carbon alloys" and "iron–chromium–nickel–carbon alloys."]

Abrasives, boron carbide, 283; diamond-bort replacement by boron carbide, 283; diamond-dust in metallography, 295; shot and sand testing, 284; silicon carbide paper in cleaning, 406

Absorptiometric Analysis, determination of chromium, 300

Accles and Pollock, Ltd., sodium hydroxide descaling, 406

Acetic Acid, corrosion of cast iron in, 299

Aciéries et Forges de Firminy, open-hearth chrome–magnesite bricks, 396; producer gas, 363

Adhesion, test for electrodeposits, 181; test for enamels, 181

Africa, ore mining, 73

Aga Heat, Ltd., foundry, 402

Ageing, of austenite, 193; austenite stabilization by, 297; effect on Bauschinger effect on beams, 84; electron-microscope study of microstructural changes during, 120 (*Appendix*); impact strength after, 184; notched-bar strength relation with composition, 408; quench, effect on strain ageing in iron, 344 (*Discussion*); quench, of iron, 344 (*Discussion*); sensitivity of carbon steels, 292; sensitivity of Spanish steels, 292; strain, effects of vanadium or chromium in rimming steels, 9 (*Paper*); strain, of iron and steel, 409; strain sub-zero, effect on iron stress/strain, 183

Air, dehumidification for corrosion control, 299; pollution control in iron and steel industry, 198; pollution-study program, 403

Aircraft Parts, chromium plating, 181; corrosion protection, 299; engine-mount testing, 293; forging, 177; fuel-tank rubber-base coating, 289; fuselage panels stretch forming, 403; investment casting, 402; stretch forming, 279; ultrasonic testing in water, 410

Aircraft Steel, composition and properties, 89; crack sensitivity, 294; for stratospheric flight, 294

Alloy Phases, equilibrium, 193; transformation concepts, 193

Alloy Steel, analysis by spectroscopy, 92; behaviour, 295; carbides formation in annealing, 297; casting in synthetic-sand mould, 275; corrosion cracking in sulphide wells, 91; corrosion-resistant, 294; corrosion in soils, 298; creep-rupture tests, 88; determination of Mn, Cr, and V in, 92; developments,

Alloy Steel—*continued*
189, 294; fusion cutting, 83; glass-industry applications, 189; the 475° C. hardening characteristics, 97 (*Paper*); heat-resisting, 293; identification, 188; identification by sparking, 188; identification by steeloscope, 300; nitrogen-containing, 396; specification code, 295; spectrographic analysis, 196; structural, 89; thermoelectric power, 186; toughness at low temperatures, 183; transformation excitation by α-iron, 192; tube extrusion, 82; weld-metal temper brittleness, 281; welded, delayed brittle fracture in, 282

Alloy Steel Products Co., Cr–Ni steel castings, 80

Alloy Structure, superlattice, 193

Alloys, iron–aluminium heat-treatment and magnetic properties, 187; iron–aluminium single-crystal preparation, 192; iron–aluminium–cobalt–nickel magnetic, 187; iron–aluminium–nickel powder magnets, 182; iron–arsenic–carbon, 412; iron–carbon high-purity, tensile and impact properties, 108 (*Paper*); iron–carbon phase, 297; iron–chromium scaling characteristics, 299; iron–chromium–cobalt rigidity modulus and temperature coefficient, 182; iron–chromium–nickel magnetic shunt, 187; iron–cobalt liquidus–solidus relations, 212 (*Paper*); iron–cobalt order–disorder, 193; iron–cobalt–molybdenum, 297; iron–cobalt–vanadium physical properties, 183; iron–copper, Fe separation by O blowing, 90; iron–manganese, γ and ε phases, 91; iron–manganese–carbon equilibrium diagram, 193; iron–manganese–carbon high-purity, tensile and impact properties, 108 (*Paper*); iron–molybdenum–nickel, 297; iron–nickel, Fe separation by O blowing, 90; iron–nickel order–disorder, 193; iron–silicon–carbon, carbides identification, 31 (*Letter*); iron–silicon–carbon diagram corrections, 412; iron–silicon–carbon thermal and microscopical study, 249 (*Correspondence*); iron–zinc powder properties, 407; iron–zinc powder sintering, 407

Alnico, powder permanent magnets, 182

Alumina, determination in refractories, 196; refractories, 76, 166; thermal conductivity, 395

Aluminium, bonding by Al–Fin process, 287; clad steels, 287; coating on iron

Aluminium—*continued*
and steel, 287; coatings, 287; determination with Fe in galvanizing zinc, 196; diffusion in steel, 287; effect on creep of superheater tubes, 87; effects in cast iron, 89; equilibrium with O in liquid iron, 273; low-temperature behaviour, 88; relationship with steel grain-size, 196; rubber-based coatings, 289; spraying on steel, 287; spraying on steel tubes, 287

Aluminium Alloys, sheet fatigue tests, 86; thermoelectric power, 186

Aluminium Bronze as weld filler metal, 283

Aluminium Nitride, determination in steel, 299

American Foundrymen's Association, foundry safety, health, and air pollution, 403; safety training, 277

American Iron and Steel Institute, list of high-temperature steels, 293

American Society for Testing Materials, elastic-modulidetermination, 408; non-destructive-tests standards, 410

Anaconda Mining Co., sponge-iron production, 272

Analysis, 92, 195, 299, 413; absorptiometric determination of chromium, 300; chromatographic drop-counting fraction cutter, 196; colorimetric determination of iron, 299; colorimetric determination of sulphur, 92; colorimetric determination of Ti in presence of P, 92; colorimetric, of iron ore, 196; coulometric, with titanic chloride, 195; effect of dish size on ash determination, 300; electrochemical, 413; gravimetric, 413; gravimetric determination of sulphur in basic steelmaking slags, 28 (*Paper*); photometric determination of CO_2 in gas streams, 196; photometric determination of molybdenum, 300; photometric determination of silicon, 299; physical methods, 92; polarographic, 413; potentiometric determination of molybdenum, 300; spectrochemical, 196; spectrochemical excitation unit, 196; spectrochemical powdered-samples technique, 196; spectrographic, 196; spectrographic, of alloy steels, 196; spectrographic, carbon electrode for, 299; spectrographic, concave grating for, 196; spectrographic determination of nitrogen, 300; spectrographic instruments, 413; spectrophotometric developments, 195; spectrophotometric split-beam detector,

Analysis—*continued*
413 ; spectroscopic, of alloy steels, 92 ; titrametric methods, 413 ; X-ray fluorescent, 92, 287, 300
Analysis of, alloy steels by spectroscopy, 92 ; chromium ores, 414 ; clays, 414 ; ferro-vanadium, 92 ; gas by dynamic method, 413 ; gas by manometry, 196 ; gas by Onera apparatus, 300 ; iron ore by colorimetry, 196 ; iron and steel, 299 ; 415 (*Book*) ; limestone, 300 ; low-alloy steel by spectrography, 196 ; magnesite, 414 ; pig-iron for nodular-iron production, 92 ; sponge iron, 300 ; steel by X-ray fluorescence, 92 ; synthesis gas, 414 ; vanadium ores and slags, 92
Anglo-American Council on Productivity, machine tools, 94 (*Book*)
Annealing, austenite decomposition in, 176 ; carbides formation in, 297 ; with charcoal water gas, 175 ; Cr–Ni steels, 403 ; cold-rolled strip, 176 ; effect on magnetic properties, 187 ; effect on rigidity modulus, 182 ; fast gas method, 278 ; magnetic, magnetostriction in, 409 ; methods comparison, 403 ; nodular iron, 399 ; principles and practice, 176 ; in steam, 403 ; whiteheart malleable castings, 79
Annealing Furnaces, bell-type, 176 ; carbon-restoration type, 81 ; clover-leaf design 176 ; for cold-rolled strip, 176 ; fast gas type, 278 ; roller-hearth, for cold strip, 176 ; for sheet steel, 81
Antimony, coatings, 287 ; effect on temper brittleness, 358 (*Discussion*)
Appleby-Frodingham Steel Co., iron pretreatment for open-hearth, 170 ; ore-preparation plant, 163 ; railway traffic, 341 (*Discussion*) ; relining and enlarging No. 9 blast-furnace, 143 (*Paper*)
Arc Furnaces. *See* Electric Furnaces
Arc Welding. *See* Welding
Armco Steel Corp., magnetic study of Cr–Ni steels, 292 ; precipitation-hardened stainless steels, 89 ; steelworks plant, 168
Armour Plate, quenching in press, 176
Arsenic, effect on temper brittleness, 358 (*Discussion*) ; system with Fe, 412
Atlantic Wire Co., annealing, 403
Atlas Steels, Ltd., continuous casting, 398
Austenite, ageing change, 193 ; decomposition in annealing, 176 ; decomposition in isothermal treatment, 278 ; deformation in relation to hardness characteristics, 347 (*Discussion*) ; grain-size determination, 296 ; nucleation position, 192 ; pearlite transformation, effect of grain-size, 192 ; residual, transformations, 297 ; retained, determination by X-rays, 297, 412 ; retained, as function of carbon content, 296 ; stabilization, 193 ; stabilization by ageing, 297 ; stabilization in transformation, 192, 193 ; thermal stabilization in carburizing steels, 347 (*Discussion*) ; transformation, 90 ; transformation to bainite, 347 (*Discussion*), 412 ; transformation, effect of prequench, 412 ; transformation, effect of rapid heating, 412 ; transformation excitation by α-iron, 192 ; transformation by fracture, 412
Australasia, iron-ore deposits at Cockatoo Island, 163
Australia, dolomite quarrying, 394 ; drop forging in, 176 ; heat-treatment facilities, 403 ; iron-ore deposits of Eyre peninsula, 391 ; iron-ore and mineral resources, 269 ; metals conservation, 93 ; rolling-mill plant, 280 ; shipbuilding steels, 396
Australian Forge and Engineering Pty., Ltd., drop forging, 176
Automobile Industry, magnetic testing, 87 ; plastic dies in, 177
Automobile Parts, axle-shaft induction hardening, 175 ; bodies deep drawing, 279 ; bodies preparation for painting, 285 ; connecting-rod production, 279 ; crankshafts continuous forging and heat-treatment, 279 ; crankshaft forging, 177 ; design for fatigue, 291 ; gear heat-treatment, 278 ; piston-ring casting, 276 ; piston-ring microstructural indices, 89 ; piston-ring wear study by radio-isotopes, 280
Babcock and Wilcox Co., heavy press, 403 ; tube extrusion, 82 ; continuous casting, 274
Bainite, effects of high-temperature heating on isothermal formation, 347 (*Discussion*) ; formation, 347 (*Discussion*) ; reaction, 412
Bearings, Babbitt, on grey-iron, 287 ; ball, steels for, 295 ; bimetallic, stress determination, 83 ; build-up by electro-deposited iron, 288 ; interfacial friction in, 281 ; load and friction formulae, 281 ; lubricants-viscosity effects, 180 ; lubrication formulae, 281 ; lubrication study, 83 ; materials properties, 83 ; oil-film/bearing-system chemical changes, 180 ; oil flow in, 179, 180 ; roll-neck, hydrodynamic lubrication, 353 (*Discussion*) ; roller, cleaning, 285 ; roller, energy losses, etc., 281 ; rolling-mill, 178 ; slide, Reynolds equation for lubrication, 179
Bechuanaland, ore deposits, 73
Belgium, corrosion-research institute, 194 ; new coking plants, 269 ; ultrasonic test methods, 87
Bend Tests, fatigue failure, 291 ; stress factors in notched flat bar, 408 ; study on chromium steel, 290 ; yield-point, 183
Bentonite, effect of moisture, 174 ; as moulding-sand binder, 80, 400 ; moulding sands, 172
Benzaldehyde, production from blast-furnace gas, 165
Benzole, refining, 270
Beryllia, thermal conductivity, 395
Beryllium Copper, rod elastic moduli, 408
Bessemer Converter. *See* Converters
Bessemer Process, basic, 302 (*Book*) ; basic, manganese separation from spiegeleisen, 398 ; bath-movement study by models, 168 ; CO_2/O refining, 77 ; nitrogen behaviour in carbon period, 272 ; oxygen blowing, 168 ; P_2O_5 solubility in slags, 168 ; steam/oxygen blowing, effects on steel properties, 78
Bessemer Steel, basic, production, 302 (*Book*) ; basic, production by Soisson-Rodange process, 273 ; basic, properties of steam/oxygen blown, 78 ; basic refinining with CO_2/O mixture, 77 ; basic, rolling and working properties, 88 ; casting, cooling agents in, 80 ; desulphurization with soda slags, 272 ; effect of oxygen-enriched air and double-slag working, 168 ; impact strength and composition, 184 ; low-nitrogen, production, 168 ; low-nitrogen, production in oxygen-blown arc furnace, 168 ; low-nitrogen, production in small converter, 168 ; welded, effect of cold rolling, 411
Bethlehem Steel Co., accident prevention, 198 ; Marmora-ore deposits, 268 ; wire-drawing lime baths, 279
Biographies, *frontispiece,* also to face 200, 304 ; contributors to *Journal,* 71, 159, 389
Birdsboro Steel Foundry, safety scheme, 277
Blades, production, 284
Blast-Furnace, 76, 166, 271, 395 ; automatic control ; blowing-out at Appleby-Frodingham, 148 ; carbon-lining preparations, 76 ; carbon-refractories experiences, 76 ; charcoal, effects on Brazil forests, 197 ; charging by conveyor belts, 77 ; design developments, 395 ; design trends, 166 ; design in U.S.A., 166 ; development history at U.S. Steel Co., 167 ; experimental, for spiegeleisen, 398 ; high-top-pressure operation, 271 ; high-top-pressure operation at Clyde, 395 ; historical development, 197 ; large, development and efficiency, 167 ; low-shaft, 166, 271 ; low-shaft, comparison with electric furnace, 77 ; low-shaft research, 166 ; model, 395 ; new, at Cargo Fleet, 395 ; new, at Crucible Steel, 395 ; refractories attack, 271 ; relining and enlarging at Appleby-Frodingham, 143 (*Paper*) ; tuyeres, new design, 271 ; water failure, 395
Blast-Furnace Coke, *consumption in pig and* scrap remelting, 77 ; economy, 77 ; permeability tests, 333 ; size at tuyere zone, 167
Blast-Furnace Gas, benzaldehyde production from, 165 ; cleaning developments, 272 ; cleaning by disintegrator, 395
Blast-Furnace Plant, blowing by gas turbine, 280 ; blower coats, 76 ; blowers, 76, 166 ; conveyor-belt charging, 167 ; French progress, 166 ; instrument panels, 77 ; instrumentation, 396 ; skip bridge at Bilston, 166 ; temperature measurement and control equipment, 270
Blast-Furnace Practice, 76, 166, 271, 395, 415 (*Book*) ; "airless" working, 167 ; aspects, 167 ; blowing-out at Appleby-Frodingham, 148 ; charging by belt, 167 ; coke economy by blast variations, 395 ; desulphurizing in runner, 77 ; ferromanganese fume control, 198 ; pig-iron granulation, 272 ; primary records, 166 ; at Redcar, 271 ; scrap, remelting, 77 ; spiegeleisen production, 398 ; water-failure measures, 395
Blast-Furnace Process, 415 (*Book*) ; combustion-zone study by cinematography 167 ; developments review, 395 ; effect of blast moisture, 76 ; effect on coke size, 167 ; heat-balances construction, 236 (*Paper*) ; model studies, 395 ; pressure drop in, 272 ; raw-materials permeability, 331 (*Paper*) ; reduction by carbon 272 ; silicon equilibria, 167 ; stock-permeability tests, 331 ; stoichiometric analysis, 167
Blast-Furnace Slag, Si/H/Fe equilibria, 167 ; silicon reduction from, 272
Blast-Furnace Stoves, variable-turbulence, 76
Boilers, caustic cracking, 85, 91, 298 ; control rooms, 393 ; cracking of seams, 85 ; design developments, 393 ; drum bulging, 85 ; dust control, 392 ; flue-gas probe, 297 ; gamma radiography, 87 ; insulation, 271 ; plate. *See* Steel Plates ; tube corrosion, 85, 91, 298 ; tube failures, 85 ; water treatment, 298
Bolts, fatigue tests, 291 ; heat-treatment plant, 175 ; production, 94 (*Book*) ; stainless steel, 189 ; welding to sheet, 406
Book Notices, 94, 198, 302, 414
Borneo, mineral resources, 73
Boron, as alloying element in steel, 294, 396 ; in Cr–Mo–Ti steels, 189 ; determination by spectrochemistry, 196 ; determination in steel by neutron autoradiography, 300 ; effects on blackheart malleable, 410 ; effects in case-hardening and heat-treating steels, 88 ; effects on structural alloy steels, 189 ; as substitute in alloy steels, 189
Boron Carbide, as lapping medium, 283
Boron Steel, 294, 396 ; gears induction hardening, 175 ; heat-treatment behaviour, 175 ; production, working, and uses, 294
Boussingault (J.-B.), life and work, 301
Brass, brazing to steel, 283 ; determination of zinc in, 299 ; effect of torsion on elasticity, 182 ; effects of annealing and drawing on rigidity, 182 ; torsion texture, 296

Brazil, blast-furnaces charcoal position, 197 ; iron-ore export position, 197 ; railmaking at Volta Redonda, 197
Brazing, copper, *in electric furnace, 283* ; in fabrication, 283 ; industrial, 283 ; on nickel-plated coating, 283 ; protective-gas, *83* ; stainless steel, *283* ; surface alloying in, 283 ; vacuum, of clad steels, 283
British Cast Iron Research Association, research programme, 398
British Coal Utilization Research Association, *dew-point meter, 164*
British Electrical Development Association, industrial productivity with electricity, 94 (*Book*)
British Industrial Plastics, Ltd., urea resins, 401
British Iron and Steel Research Association, physical constants of steels at high temperatures, 94 (*Book*) ; determination of copper in iron and steel, 335 (*Paper*) ; *gravimetric determination* of sulphur in basic steelmaking slags, 28 (*Paper*) ; maintenance conference, 405 ; productivity conference, 170 ; rolling-mill-design conference, 280 ; slip in cold-strip rolling, 179 ; strip-gauge control in rolling, 179
British Non-Ferrous Metals Research Association, research programme, 398
British Railways, co-operation with steel industry, 94 ; iron-ore wagons, 163
British Steel Castings Research Association, 16
British Steel Founders' Association, grinding dust-control study, 403 ; research and development division, 275 ; research programme, 398
Brittle Fracture, cleavage strength of polycrystals, 25 (*Paper*) ; crane hook, 85 ; delayed, in welded alloy steels, 282 ; effect of strain rate, 185 ; equation with crack propagation, 292 ; initiation in welded structures, 281 ; in machinery, 291 ; in ships, 291 ; stress relationship, 408 ; testing, 200 ; testing by slow bend, 408
Brittleness, ageing sensitivity. 292 ; notch, 292 ; temper, aspects, 358 (*Discussion*) ; temper, effects of arsenic and antimony, 358 (*Discussion*) ; temper, in high-purity iron-base alloys, 358 (*Discussion*) ; temper, literature review, 358 (*Discussion*) ; temper, of low-alloy steels, 292 ; temper, in weld metal, 281
Broken Hill Proprietary Co., Ltd., electric furnace at Whyalla, 398 ; rolling mills, 280 ; shipbuilding steels, 296
Brown (David) Foundries Co., cement-sand moulding, 173

Cadmium, corrosion inhibition in HCl, 194
Calcium, determination in limestone, 300
Calcium Carbide, desulphurization by, 399
Canada, electric pig-iron smelting, 77 ; iron-ore deposits, 268 ; iron-ore project in Quebec and Labrador, 391 ; magnetite deposit at Ottawa, 391 ; Marmora iron ore, 268 ; open-hearth zebra roofs, 78
Cannon, early French foundry, 93
Canton Co., ore-handling plant, 391
Carbides, behaviour in niobium-stabilized stainless steel, 297 ; formation in annealing, 297 ; identification in Fe–Si–C alloys, 31 (*Letter*) ; precipitation in high-speed steel, 223 (*Paper*) ; segregation in tool steels, 191
Carbon, austenite and martensite as function of, 296 ; Delanium, 270 ; determination in coal, coke, and tar, 300 ; effect on ageing, 409 ; effect on aluminium diffusion in steel, 287 ; effect on electrolytic polishing, 180 ; equilibrium with oxygen in open-hearth, 169 ; formed, 270 ; pick-up in cupola,
Carbon—*continued* 79 ; reduction of iron oxide by in blast-furnace, 272 ; solubility in Cr–Ni steels, 403 ; *See also* Refractory Materials
Carbon Dioxide, automatic recording in *combustion tests, 414*: *in Bessemer* refining process, 77; determination by manometer, 196 ; determination by *photometry, 196* ; *determination in* synthesis gas, 414 ; heat conductivity, 87
Carbon Monoxide, *determination in* synthesis gas, 414 ; effect on corrosion in H_2S, 195 ; synthesis with Fe, 193
Carburization, *with charcoal water gas,* 175 ; copper-plate migration in, 175 ; methods, 175 ; pack, hardening after, 278 ; surface-enriched iron, 176 ; thermal stabilization of austenite in steels, 347 (*Discussion*)
Cargo Fleet Iron Co., Ltd., new blast-furnace, *395* ; rolling of broad flange beams, 339 (*Discussion*)
Carntyne Steel Castings Co., Ltd., steel foundry, *173*
Cartridge Cases, research, 290
Case Hardening, effect of boron, 88 ; gears, 403 ; grinding of parts, 283 ; by nitriding, 81 ; pin cracking, 85 ; Sulfinuz process, 278
Cast Iron, acicular, 79 ; aluminium-containing, 89 ; carbon pick-up, 79 ; chilling and mottling, 79 ; chromium–nickel, 294, 295 ; comparison with nodular iron, 89 ; corrosion in acids, 299 ; determination of Mg in, 92 ; determination of Mn, Cr, and V in, 92 ; developments, 170; early, in China, 93 ; early, in Germany, 93 ; effect of graphite on strength, 295 ; gas evolution in solidification, 277, 399, 400, 402 ; graphite crystal distortion, 191 ; grey. *See* Grey Cast Iron ; literature review, 274 ; machinability improvement by cupola deoxidation, 170 ; Meehanite applications, 190 ; Meehanite foundry, 276 ; melting conditions in relation to castings defects, 402 ; nodular. *See* Nodular Cast Iron ; nodular-graphite occurrence, 274 ; oxygen in, 171 ; phase-diagram corrections, 412 ; pickling, 285 ; pipe-wall thickness determination by ultrasonics, 293 ; residual stresses, 402 ; solidification, gas evolution during, 277, 399, 400, 402 ; solidification study method 277 ; static strength, 295 ; structural, 411 ; surface-tension measurement, 86 ; tellurium addition, 171 ; wear-resisting, 292 ; welding mild-steel studs to, 406 ; weld blow-holes, 406 ; white. *See* White Cast Iron
Cast Steel. Bessemer, cooling agents for, 80
Casting, 172 ; centrifugal. *See* Centrifugal Casting ; continuous. *See* Continuous Casting ; design in, 398 ; die, mould fatigue, 402 ; feeder-head losses, 80 ; feeder heating by electricity, 80 ; feeding compound, 172 ; heavily loaded parts, 274 ; ingots, 78 ; inversion process, 173 ; investment. *See* Investment Casting ; manganese steel, 80 ; metal flow in mould, 277 ; metal flow in runners, 401 ; metal penetration in, 402 ; nodular iron, 399 ; precision. *See* Precision Casting ; pulleys, 174 ; roll, in Yugoslavia, 81 ; work of Leonardo da Vinci, 197
Castings, band-saw cutting, 277 ; cleaning, 276 ; costs comparisons with weldments, 180 ; defects, 81 ; defects classification, 81 ; defects occurrence, 402 ; defects in relation to melting conditions, 402 ; design, 398 ; enamelled, pin-holing and boiling in, 407 ; fatigue failures, 291 ; fettling, 277 ; gas evolution in solidification, 277, 399, 400, 402 ; grey-iron. *See* Grey-Iron Castings ; hot tearing in relation to sand hot compressive strength, 400 ; laquering, 288 ; machine-tool,
Castings—*continued* practice, 274 ; malleable-iron. *See* Malleable-Iron Castings ; piston-ring, 276 ; porous, *impregnation with* Permafil resin, 277 ; porous, impregnation by vacuum pressure, 277 ; radiography, 87 ; *repair by welding, 283* ; riser positioning, 173 ; risering, 401 ; risers with gas-generating charges, *173* ; *risers, necked down-type, 401* ; shell-moulded, 401 ; shrinkage cavities, 277 ; shrinkage and piping, 277 ; *soldification, 398* ; steel. *See* Steel Castings ; stove-grate, 402 ; stress-relief furnace, 81 ; surface finish, effect *of sand flowability, 400* ; *testing by* ultrasonics, 282 ; vacuum impregnation, 81 ; with weldments, 405
Cathodic Protection, *corrosion-rate measurement,* 194 ; with magnesium anodes, 298 ; potential and current for, 298
Caustic Soda, in investment casting, 173
Cement, kiln heat balance, 393 ; for moulds, *172*, 173
Cementation, *antimony on iron,* 287
Cementite, orientation relationships with α-iron, 296
Centrifugal Casting, cast-iron pipes, 276
Cerium, effects on stainless steels, 396
Chain, heat-treatment effects, 182 ; high-temperature deterioration, 85 ; welded, 406
Chain Belt Co., multiple moulding, 401
Chamosite, deposits, 391
Charcoal, Brazil position, 197 ; in water-gas production, 175
Chi Phase, in Cr–Mo steels, 296
China, early cast iron, 93
Chlorine, determination in coal, 196 ; determination in cyanide wastes, 300
Chromatographic Analysis, drop-counting fraction cutter, 196
Chromite, analysis, 414 ; in Anatolia, 268 ; beneficiation, 74 ; beneficiation research, 398 ; Greek production data, 93 ; Turkish production data, 93 ; *See also* Refractory Materials
Chromium, determination by absorptiometry, 300 ; determination with Mn and V, 92 ; determination by oxidation, 195 ; determination in presence of V and Fe, 92 ; determination during steel melt, 92 ; diffusion in iron, 286 ; diffusion in steel, 286 ; effect on cast-iron abrasion, 295 ; effects on strain ageing of rimming steels, 9 (*Paper*) ; oxidation and vapour pressure, 195 ; pick-up due to chrome-magnesite refractories spalling, 397 ; thermionic constants, 87
Chromium Iron, the 475° C. hardening characteristics, 97 (*Paper*)
Chromium–Manganese Steel, for rails, 295 ; replacement by Cr steel, 189 ; substitution for nickel steel, 411
Chromium – Manganese – Molybdenum – Nickel Steel, effect of boron, 189
Chromium–Molybdenum Steel, chi phase, 296 ; creep and relaxation, 189 ; forging, 403 ; pipe fabrication, 88 ; welded, structural changes in, 406
Chromium – Molybdenum – Nickel Steel, corrosion structures in acids, 242 (*Paper*) ; creep, 293 ; heat-treatment, 293 ; investment casting, 411
Chromium – Molybdenum – Nickel – Niobium Steel, iron niobide separation, 90
Chromium – Molybdenum – Titanium Steel, boron in, 189
Chromium – Molybdenum – Vanadium Steel, determination of molybdenum in, 300 ; high-temperature, 189
Chromium – Nickel Cast Iron, 294, 295
Chromium–Nickel Steel, annealing, 403 ; carbon solubility in, 403 ; creep curves, 293 ; δ-ferrite stability, 316 (*Letter*) ; fatigue and elastic modulus, 186 ; induction-furnace melting, 80 ; magnetic properties, 292 ; magnetic properties, effect of fatigue, 292 ; replacement by Cr steel, 178 ; temper brittleness, 292 ;

Chromium–Nickel Steel—*continued*
transgranular stress corrosion, 218 (*Correspondence*) ; welding in argon arc, 283
Chromium Plating, 286 ; aircraft parts, 181 ; crankshafts, 181 ; hard, 286 ; hard, of aircraft parts, 181 ; hard, of crankshafts, 181 ; protective coatings on, 407 ; of steelworks plant, 181 ; of worn parts, 286
Chromium-Plating Solutions, automatic Cr-salt precipitation from, 181 ; regeneration by ion exchange, 285
Chromium Steel, bending study, 290 ; corrosion cracking in H_2SO_4 wells, 91 ; structure and heat-treatment, 294 ; substitution for austenitic steel, 293 ; substitution for Cr–Mn steel, 189 ; substitution for Cr–Ni steel, 178 ; working, 178
Chromium – Tungsten – Vanadium Steel, production, 273
Chromium–Vanadium Steel, high-temperature, 189 ; tools heat-treatment, 81 ; transformation kinetics, 192
Chromizing, 407 ; iron, 286 ; methods, 286
Chrysler Corp., bar pointing, 279 ; bodies preparation for painting, 285 ; crankshaft forging, 177 ; plastic pressing dies, 177
Cie des Forges de Chatillon-Commentry, plant and products, 272
Clad Metals, welding and riveting, 83
Clad Steel, aluminium, 287 ; lead and copper, 287 ; plates and sheet, 407 ; production and properties, 288 ; vacuum brazing, 283
Cleaning, 84, 180, 284, 406 ; abrasive methods, 180, blast, mono-rail conveyor in, 401 ; castings, 276 ; by cold wetting agent, 406 ; developments, 284 ; electrolytic, of continuous strip, 178 ; for electroplating, 84 ; for enamelling, 181; flame, 84 ; Hydroblast, sand re-use, 401 ; mechanical, of strip, 406 ; pressure-jet lapping, 84 ; processes and equipment, 84 ; roller bearings, 285 ; sand-blasting abrasives, 284 ; sand reclamation for cores, 400 ; shot blasting. *See* Shot Blasting ; study by radio-isotopes, 285 ; ultrasonic, 285 ; tumbler, by airless blast, 284 ; vacuum-blast, 180
Cleveland-Cliffs Mining Co., ore flotation, 269
Coal, analysis tolerances, 414 ; ash determination, effect of dish size, 300 ; beneficiation-yield formulae, 75 ; breakability assessment, 165 ; centrifugal separators, 165 ; cleaning, 74 ; coking, effect of moisture content, 75 ; coking in electric furnace, 75 ; coking, hydrocarbons yield, 75 ; coking, plastic properties, 363 ; coking practice in Britain, 269 ; coking in terms of pressure, 75 ; coking tests, 165 ; conveyors, 163 ; dense-media washing, 74 ; density as index, 363 ; determination of carbon and hydrogen in, 300 ; determination of chlorine in, 196 ; determination of sulphur in, 196 ; dust electrostatic preparation, 74, 75 ; evaluation by vitrain indices, 74 ; filtration in beneficiation, 74 ; fluidization behaviour, 269 French production, import, and export data, 197 ; gig washers, 165 ; industry combination with iron, etc., industries, 197 ; Istria, 165 ; magnetite separators, 74 ; mineral-species assessment, 363 ; moisture factor, 269 ; preparation costs, 165 ; preparation-plant design, 363 ; preparation quality control, 269; Rasa, 165 ; reactivity, effect of iron oxide, 165 ; sampling, 165, 363 ; shatter-test assessment, 165 ; Simcar washer, 269 ; solvent-extraction study, 165 ; South American deposits, 197 ; swelling, effects of additions, 165 ; swelling-pressure measurement, 75 ; tar, 270 ; testing, 165 ; volatiles emission and combustion, 164 ; washery pilot plant, 269 ; washery costing, 75
Coatings, 84, 181, 285, 407 ; asphaltic, 289 ; ceramic, 288 ; ceramic, developments, 288 ; ceramic, for high-temperature parts, 181 ; ceramic, properties, 289 ; electrodeposited. *See* Electrodeposited Coatings ; enamel. *See* Enamels; lacquer, 288 ; lacquer, on chromium plate, 407 ; metal, thickness determination form spark spectra, 286 metallic, 181 ; neoprene, 288 ; on non-homogeneous metals, 84 ; organic, 194, 288 ; paint. *See* Paints ; phosphate. *See* Phosphate Coatings ; protective, 193 ; protective, on chromium plate, 407 ; protective metal, 288 ; protective paint, 407 ; protective resin, 288 ; protective, testing, 286 ; pyrophyllite, 407 ; rubber-based aluminium, 289 ; thickness determination, 86 ; thickness determination by ultrasonics, 293 ; vapour-phase deposition, 84, 407 ; water-pipe, 407
Cobalt, conservation, 93 ; determination reagents for steels, 92 ; flame plating on metals, 288 ; polarization in solutions, 412 ; precipitation from Fe-containing solutions, 196
Cobalt–Molybdenum–Nickel Alloys, phases, 297
Coke, American production data, 197 ; ash, silicates decomposition for analysis, 93 ; blast-furnace, consumption in remelting, 77 ; blast-furnace, economy, 77 ; blast-furnace, permeability tests, 333 ; blast-furnace, size at tuyere zone, 167 ; Committee activities, 363 ; determination of carbon and hydrogen in, 300 ; French production, import, and export data, 197; grinding mill, 363 ; iron-rich, ore-fines and flue-dust additions, 165 ; production in electric furnace, 75 ; reactivity testing, 165
Coke-Oven Gas, desulphurization by wet process, 75 ; distillation preparation, 75 ; in open-hearth firing, 78 ; sulphur production from, 270
Coke-Oven Plant, American history, 197 benzole recovery, 270 ; benzole washing, 75 ; British, 269 ; by-products production data for U.S.A., 197 ; by-products recovery, 75 ; Coppée, in Belgium, 269 ; cost accountancy, 363 ; oil yield, 75 ; at Vryheid, 363 ; water cooling, 269
Coke Ovens, firing with lean gas from iron-rich coke, 165 ; gas-collecting-chamber temperature control, 75 ; heat balance, 269 ; heating systems, 75 ; operation developments, 75 ; suction doors, 75 ; temperature, effect on hydrocarbons yield, 75
Cold Drawing, American advances, 278 ; effect on rigidity modulus, 182 ; of shells, 177 ; strain-gauge applications, 280
Cold Rolling, effect on later welding, 411 ; effect on steel density and hydrogen occlusion, 294 ; magnetic after-effect, 86 ; strip slip in, 179 ; strip, speed-dependent variables, 353 (*Discussion*); strip-thickness control by " T " method, 353 (*Discussion*) ; strip thickness control by tension variation, 353 (*Discussion*)
Cold Working, effect on elastic modulus, 182 ; effect on electrical conductivity, 293 ; effect on mechanical properties, 408 ; effect on precipitation hardening, 409 ; with steel balls, 279 ; X-ray studies, 192
Colombia, iron and steel industry, 197 ; steelmaking raw-materials resources, 197
Colorado Fuel and Iron Corp., personnel relationships, 301
Colorimetric Analysis, determination of iron, 299 ; determination of sulphur, 92 ; determination of Ti in presence of P, 92 ; of iron ore, 196
Colvilles, Ltd., blast-furnace high-top-pressure operation, 395
Commonwealth Steel Co., Ltd., shipbuilding steels, 396
Compagnie de Fives-Lille, diesel crankshafts production, 278
Compagnie Générale d'Electricité, foundry plant, 276
Compressed Air, centrifugal compressors, 402 ; costs, 402
Compressors, blade precision casting, 276
Concrete, prestressed, wire for, 89
Continuous Casting, in Canadian works, 398 ; machine for steel, 170 ; plant, 274 ; stainless steel, 274 ; steel by Junghans process, 274
Converters, basic, 302 (*Book*) ; basic refractories, 76 ; blower design and control, 168; bottom-preparation method, 168 ; model studies, 168 ; oxygen blowing 168; oxygen/CO_2 blowing, 78; oxy-, gen/steam blowing, 78 ; slags, high-manganese production from spiegeleisen, 398 ; slags P_2O_5 solubility, 168
Conveyors, for blast-furnace charging, 167 ; coal, 163 ; mono-rail, in cleaning shop, 401 ; ore, 391 ; roller, for moulds, 174 ; for sand unloading, 174
Cooling, Ac_1 transformation, 90 ; continuous, transformation diagrams, 33 (*Paper*) ; transformations, 412 ; water-system corrosion, 298 ; water treatment, 298
Copper, beryllium, rod elastic moduli, 408 ; brazing, 283 ; clad steel, 287 ; corrosion in H_2S and SO_2, 195 ; corrosion immunizers, 297 ; determination in iron and steel, 335 (*Paper*) ; effect on railroad corrosion, 298 ; precipitation from sponge iron, 272 ; strip yielding between dies, 177
Copper Alloys, determination of silicon in, 299 ; welding to steel, 283
Copper Plating, migration in carburization, 175 ; steel wire, 407
Copper Steel, corrosion in railways, 298
Coremakers Co., core production, 275
Coremaking, large-scale, 275 ; machine, 275
Cores, assembly, 174 ; baking, 275 ; baking times and thickness, 401 ; binders microscopical study, 401 ; binders selection, 174 ; blacking additions, 172 ; buoyancy, 275 ; gas-content determination, 173 ; gas-evolution testing, 80 ; metal penetration, 173 ; mix ingredients, 171 ; olivine, 275 ; ramming with reclaimed sand, 400 ; sand storage, 275 ; synthetic-resin binders, 172 ; testing, 275 ; washes, 173
Corrosion, 91, 193, 297, 412 ; acid, Cr–Mo–Ni steel microstructures in, 242 (*Paper*) ; boiler flue-gas, test-probe, 297 ; boiler tubes, 85, 91 ; cast iron in acids, 299 ; cavitation, in turbines, 91; in central-heating systems, 195 ; copper in H_2S and SO_2, 195 ; copper immunization, 297 ; electrochemical, 412 ; Evans-cells studies, 194 ; fatigue in turbines, 299 ; in fluorine, 92 ; fretting, relation with friction, 185 ; galvanic, effect of titanium, 298 ; galvanized steel in soil, 297 ; in H_2S and SO_2, 195 ; immunizers, 297 ; industrial, 297 ; inhibition by Calgon, 298 ; inhibition by inorganics in acid, 194 ; inhibition mechanisms, 91 ; inhibition in oil tankers, 413 ; inhibition in power plants, 92 ; inhibition by wetting agents, 194 ; inhibitors, 194 ; intercrystalline, in caustic cracking, 298 ; intergranular, susceptibility testing of stainless steel, 413 ; inverse dependencies, 91 ; iron in HCl, 194 ; iron–zinc cell, 195 ; in liquid SO_2, 195 ; by lubricants, 298 ; by lubricants, study by radio-isotopes, 280 ; mechanism and prevention, 195 ; mechanisms, 91; of oil tankers, 413 ; by packaging-paper moisture, 413 ; passivation of tinplate, 195 ; phase-boundary, 194 ; polarization of Fe, Co, and Ni, 412 ; polarization and passivity, 412 ; prevention by dehumidification, 299 ;

Corrosion—*continued*
prevention history, 299 ; problems, 413 ; protection of aircraft parts, 299 ; protection by organic coatings, 194 ; protection by phosphate coatings, 195; protection of structural steel, 193, 194; protective primers, 195 ; railway, effect of copper, 298 ; relationship with oxide-film thickness, 91 ; research developments, 193 ; research in Belgian institute, 194 ; research in Italy, 194 ; rust. *See* Rust ; soil-resistivity measurement, 298 ; in soils, 298 ; stainless steels in oxidizing solutions, 299 ; stress, 91 ; stress cracking of mild steels in nitrate solution, 140 (*Correspondence*), 317 (*Correspondence*) ; stress cracking of pressure vessels, 413 ; stress cracking susceptibility testing, 413 ; stress, of oil-well tubing, 91 ; stress transgranular, in chromium–nickel stainless steels, 218 (*Correspondence*) ; by sulphur aqueous suspensions, 298 ; superheater materials, 92 ; testing, in boiler flue gas, 297 ; tests, 91 ; tuberculation, 298 ; turbine blades, 299 ; water-tube, 298 ; welded structural steel, 194 ; wetting in, 194

Corrosion Cracking, stress, of mild steels in nitrate solution, 140 (*Correspondence*), 317 (*Correspondence*) ; stress, of pressure vessels, 413 ; stress, susceptibility testing, 413 ; in sulphide wells, 91 ; turbine blades in H_2S, 195

Corrosion Resistance, electrodeposited coatings, 91 ; materials for chemical industry, 91 ; review, 195 ; silicon iron, 171 ; silicon steel in HCl, 413 ; sintered alumina, 76 ; stainless steel, effect of electropolishing, 180 ; stainless steel in nitric acid, 194 ; stainless steel in H_2SO_4, 299

Coulometric Analysis, titanic chloride in, 195

Cracks, in aircraft steels, 294 ; in bent tubes, 85 ; in boiler seams, 85 ; in case-hardened pins, 85 ; caustic, in boilers, 85, 91, 298 ; caustic, intercrystalline corrosion in, 298 ; caustic, prevention, 298 ; corrosion. *See* Corrosion Cracking ; crane-wheel, 85 ; detection by electric current, 87 ; detection by Magnaglo and Zyglo methods, 188 ; detection by magnetic induction, 188; detection by magnetic particles, 293 ; detection by magnetics, 87, 293 ; detection methods comparison, 293 ; detection by oil powder method, 87 ; detection by radio-isotopes in solution, 188 ; detection by ultrasonics, 87 ; equation with brittle fracture, 292 ; fatigue, propagation and detection, 188 ; fatigue, in hoist drums, 186 ; welding, of mild steel, 405

Cranes, A.C. motors, 405 ; design, 405 ; electrical codes, 179 ; electrical control systems, 179 ; electrical equipment, 405 ; gland-iron fracture, 85 ; hook brittle fracture, 85 ; stress determination standards, 83 ; wheel cracking, 85 ; wire-rope construction, 179

Crankshafts, continuous forging and heat-treatment, 279 ; diesel, production, 278 ; renovation by chromium plating, 181 ; steam-engine, fracture, 85 ; stress analysis on models, 290

Craven Bros., Ltd., ingot planer, 284

Creep, of Cr–Mo–Ni steels, 293 ; effect of aluminium, 87 ; effect of heat-treatment, 87 ; of forgings, 293 ; of high-temperature metals, 293 ; mechanical strength in, 192 ; nitrides formation during, 297 ; of steel wire, 293 ; time/temperature relationships, 88 ; Ti-stabilized stainless steel, 88

Creep Tests, of alloy-steel sheets, 88 ; ductility in, 189 ; hot, 293 ; for jet-engine materials, 293 ; laboratory for, 293 ; machines, 293 ; relationship with relaxation, 189

Crucible Steel Co., blast-furnace plant, 395

Crucibles, graphite, 76

Crystallization, imperfections symposium, 192 ; in nodular iron, 79, 275 ; substructures in, 192

Cuba, steelmaking raw-materials resources, 197

Cupola, basic, dephosphorization in, 79 ; basic lining, 274 ; blower control by Askania, 170 ; blower costs, 76 ; calcium carbide injection, 399 ; carbon pick-up in, 79 ; charge-level indicator, 399 ; charging by continuous mechanical system, 276 ; deoxidation in, for machinability, 170 ; dephosphorization in, 399 ; design and operation in U.S.S.R., 170 ; effect of blast volume 274 ; emission-control equipment, 399; fume purification, 79 ; gas-composition calculation, 399 ; high-blast-temperature practice, 274 ; hot-blast, at Husqvarna, 399 ; losses and pick-up in, 399 ; model, in French laboratory 402 ; model, melting study in, 402 ; pressure drop in, 272 ; practice for machine-tool castings, 274 ; raw materials, 170 ; refractories, 274 ; scrap-charging considerations, 170 ; stack-height aspects, 399 ; water-cooled, 170

Cutting, bandsaw, 277, 284 ; flame. *See* Flame Cutting ; fluids, 284 ; fusion, of stainless steels, 83 ; heat flow in, 406 ; speed/tool-life relations, 284 ; tests, 284

Cutting Tools, life relationship with speed, 284 ; rake, etc. ; 283, testing, 284 ; wear by cratering, 283 ; wear study by radio-isotopes, 280

Cyanates, determination of chlorine in, 300

Czechoslovakia, electric-spark treatment of tools, 180 ; forging in, 403 ; iron-ore production data, 93 ; low-temperature tests, 88 ; steelmaking methods, 170 ; stress-analysis laboratory, 290

Damping, effects of dislocations and impurities on single crystals, 192 ; heat-resisting materials, 85 ; wire vibration, 411

Darlington and Simpson Rolling Mill Co., Ltd., light-section mill, 280

da Vinci (Leonardo), casting techniques, 197

Decarburization, steel surfaces, 411

Deep Drawing, automobile bodies, 279 ; cupping test, 82

Deformation, critical shear in body-centred cubic lattices, 296 ; crystal imperfections from, 192 ; dislocation model, 291 ; dislocation models of grain boundaries, 192 ; dislocations, 412 ; dislocations geometry, 192 ; effect of dislocations on single crystals, 192 ; effect of hydrogen, 294 ; effect of prolonged storage, 183 ; in explosion, 85 ; grey iron, 185 ; iron, X-ray study, 295 ; microcinematographic study, 190 ; non-shear and non-slip theory, 184 ; plastic, 85 ; plastic, glide in, 185 ; plastic, relation with fatigue, 186 ; plastic, stored-energy measurement, 185 ; plastic, test theories, 184 ; plastic, theory application in beam design, 85 ; screw dislocation, 296 ; slip data, 192 ; temperature effect on electrical resistivity, 187 ; tensile stress from dislocations, 290 : twinning and low-temperature strain, 296 ; wavy, of surfaces, 184

Degreasing, methods, 84

Dejean (P.), education and career, 197

Deoxidation, in cupola, 170 ; iron by titanium, 318 (*Paper*)

Dephosphorization, in basic cupola, 79, 399

Dermatitis, protective creams, 181

Descaling, Gorcy system, 285 ; hydrogen control, 284 ; by shot blasting, 284 ; sodium hydride process, 406 ; stainless tubes, 406

Desulphurization, Bessemer steel with soda slags, 272 ; coke-oven gas, 75 ; iron, 295 ; iron by calcium carbide, 399 ; iron by soda slags, 272 ; pig iron in runner, 77

Diamonds, bort replacement by boron carbide, 283 ; dust for specimen polishing, 295

Die Casting, mould fatigue, 402

Dies, cast-metal, 174 ; hobbing, 176 ; plastic, 177 ; pressure-casting, 276 ; sinking by drop forging, 176 ; steel selection and heat-treatment, 175 ; steels, 189 ; wire-drawing sintered carbide, 404

Diesel Engines, crankshaft chromium plating, 181 ; crankshaft production in France, 278

Diffusion, in electroplate, 286 ; grain-boundary, 192 ; Kirkendall effect in alloys, 192 ; in metals, 199, 229 (*Paper*) ; phenomena, 86 ; theory, 192

Dolomite. *See* Refractory Materials

Dominica, mineral resources, 73

Dorman Long and Co., Ltd., blast-furnace practice at Redcar, 271 ; factors affecting open-hearth plant performance at Redcar, 305

Douglas Aircraft Co., drop-hammer die studs, 177 ; hydraulic press, 177 ; ultrasonic testing in water, 410

Drawing, 81, 176, 278, 403 ; bar area-reduction calculation, 82 ; cold, American advances, 278 ; cold, articulated grippers for, 279 ; cold, effect on rigidity modulus, 182 ; cold, enamelling or lacquering for, 407 ; cold, of shells, 177 ; cold, strain-gauge applications, 280 ; cup, 82 ; cups for jet engines, 279 ; lubricant, 177 ; lubrication by colloidal graphite, 279 ; reverse, of shells, 178 ; rod, 403 ; stretch, of aircraft parts, 279 ; stretch machines, 403 ; theory, 82 ; two-directional press for, 278

Drop Forging, in Australia, 176 ; die sinking by, 176 ; hammer-rod steels, 279 ; horizontal, 278 ; scale formation, 279 ; shearing for, 177

Ductility, in creep-rupture tests, 189 ; effects of temperature and stress, 408 ; notch, effect of fabrication, 290

Duralumin, effect of torsion on elasticity, 182

Dust, collector cyclones, 301 ; collectors, 301 ; concentration determination by Hemeon filter, 301 ; control in coal-fired boilers, 392 ; control in grinding, 403 ; concentration for silicosis, 81 ; control in iron and steel works, 198 ; control in open-hearth process, 198 ; DEP collectors, 198 ; extraction by bags and cyclones, 270; flue, agglomeration, 164 ; flue, in coking blends, 165 ; foundry, control, 277 ; harmful, 301; in moulding sand, 275; separators, 198

Economics and Statistics, 93, 197, 301 ; coal-washery costing, 75 ; cokemaking costing, 363 ; foundry costing, 81 ; plate-shearing costs, 405

Education, foundry, for apprentices, 81 ; in tinplate industry, 198

Elastic Modulus, determination, 87, 408 ; determination by vibration, 408 ; effect on fatigue, 186 ; effect of steel temperature, 408 ; effect of torsion, 182

Elasticity, determination for spring-making, 89 ; heat-resisting materials, 85 ; single-crystal, effects of dislocations and impurities, 192 ; stainless steel, 183

Electric Furnaces, arc basic, dimensions data, 397 ; arc, construction advances, 170 ; arc, at East Hecla, 397 ; arc, voltage flicker, 397 ; basic, oxygen refining in, 397 ; bus-bar impedance

Electric Furnaces—*continued*
formulae, 78 ; carbon-rod-resistor type, 171 ; chromium pick up from chrome-magnesite refractories spalling, 397 ; coke production in, 75 ; copper brazing in, 283 ; evolution in U.S.A. 78 ; ferromanganese production in, 398 ; foundry practice, 274 ; heat-storage measurement, 274 ; heating elements for high temperatures, 278 ; induction, for Cr–Ni castings, 80 ; induction-hardening, 278 ; induction low-frequency, 397 ; induction stirring 273, 397 ; industrial, 251 (*Discussion*); for ingot production, 170 ; laboratory, 175, 412 ; large, in South Africa, 397 ; lining techniques, 397 ; molybdenum-resistance, 182 ; oxygen-blown, for low-nitrogen steel, 168 ; performance comparisons, 273 ; for pig-iron production, 77 ; pig-iron production from ilmenite, 77 ; pig-iron production by Lubatti process, 272 ; power consumption, 253 ; regulators, 254 ; research at U.S. Bureau of Mines, 398 ; resistance, in forging, 278 ; resistor, 258 ; roof-temperature measurement by photocell pyrometers, 76 ; Söderberg electrodes, 78 ; transformers, 257 ; types, 78

Electric Steel, low-nitrogen, production by oxygen jet, 168 ; Saar production data, 93

Electrical Equipment, A.C., for intermittent loads, 405 ; armature stamping, 403 ; bus-bar impedance formulae, 78 ; crane, 179, 405 ; crane control systems, 179 ; crane codes, 179 ; lamps for inspection, 295 ; rolling-mill, 280 ; rolling-mill drive regulators, 178, 404 ; rolling-mill drives, 404 ; rolling-mill drives at Abbey, 404 ; rolling-mill multiple drives, 179 ; rolling-mill, at Port Talbot, 83 ; rolling-mill rectifiers, 178 ; servo mechanisms, 179 ; in tube production, 179

Electrical Power, in cold rolling, 280 ; corrosion control in plants 92 ; distribution in iron and steel works, 260 (*Discussion*) ; generating equipment for steelworks, 179 ; generation combination with iron, etc., industries, 197 ; generator for electroplating, 181 ; generator-rotors testing, 294 ; in industrial productivity, 94 (*Book*) ; supply equipment at Abbey, 404 ; for taconite processing, 164

Electrical Properties, thermoelectricity in metals, 186 ; transformer and dynamo sheets, 86

Electrical Resistance, effect of Ar_3 transformation, 297 ; effect of cold work, 293 ; effect of deformation temperature, 187 ; of films at low temperatures, 86 ; of joined metals, 282 ; of thin metal layers, 410

Electrical Testing, 87 ; in crack detection, 87

Electrochemical Analysis, 413

Electrodeposited Coatings, adhesion test, 181 ; corrosion-resistant, 91 ; hardness determination, 84 ; porosity studies, 286 ; testing and specification, 285 ; thickness-determination nomogram, 181 ; thickness determinaton by X-ray back reflection, 181 ; thin layers, 286 ; *See also* Electroplating

Electrodeposition, of rhodium, 288 ; at Woolwich, 181; work of Hothersall, 181

Electrolytic Galvanizing, from cyanide baths, 286

Electrolytic Machining, grinding carbide tools, 406 ; of tensile-test specimens, 183

Electrolytic Pickling, 285

Electrolytic Polishing, A.C., 180 ; effect of carbon content, 180 ; effect on hardness, 186 ; effect on stainless corrosion resistance, 180 ; methods, 285 ; optimum conditions, 285 ; plant and process, 180 ; of slides, 191 ; stainless steel. 180, 285

Electrolytic Process, 181

Electrolytic Tinplate, multiple generator system, 179 ; plant lubrication by oil mist, 281

Electron Diffraction, grinding for, 191 ; in metals studies, 89

Electron Microscope, ageing structural-changes study, 120 (*Appendix*) ; Cu–SiO_2 replicas, 295 ; Field type, 90 ; reflection, 190 ; revolving stage for, 190 ; scanning, 190 ; steel-microstructure study, 191 ; in steel studies, 190 ; surface-study symposium, 190 ; techniques, 191

Electronics, instruments, 184 ; in pyrometry, 393 ; in testing, 87

Electroplaters Ltd., processes, 181

Electroplating, cation adsorption in, 84 ; cleaning for, 84 ; developments, 181 ; drying parts, 285 ; early, in U.S.A., 286 ; flame process, 84 ; furnace-heat transfer, 181 ; generators, 181 ; quality control, 286 ; springs, 181 ; steel wire before drawing, 84 ; *See also* Electrodeposited Coatings

Electroplating Solutions, current yield, 84 ; surface-temperature control, 181 ; throwing-power, effects of special shields and cathodes, 84

Embrittlement, hydrogen. *See* Hydrogen Embrittlement ; iron and steel by H_2S, 195 ; low-temperature, effect of nitrogen, 189 ; weld, 282 ; welding, of mild steel, 405

Enamelling, base-metal practice, 181 ; electrical methods, 288 ; furnaces for, 407; of gas cookers, 181 ; pin-holing and boiling in, 407 ; porcelain, methods, 288 ; practice, 181 ; strip for forming, 407

Enamels, adhesion testing, 181 ; porcelain, defects initiation by hydrogen, 182 ; porcelain, for high temperatures, 288 ; porcelain, for low temperatures, 288 ; silica-free, 181 ; spraying, 407 ; spraying on refrigators, 288 ; synthetic, on chromium plate, 407

Engineering Materials, metals technology, 415 (*Book*)

English Steel Corp., generating equipment, 179

Erie Mining Co., magnetic roasting, 268

Extrusion, cold, of wire, 82 ; cold, of rocket parts, 404 press repair by welding, 282 ; principles and equipment, 178 ; processes, 178 ; of steel, 404 ; of tubes, 82 ; Ugine process, 279

Fatigue, 95 (*Book*) ; bending failure, 291 ; castings failure in service, 291 ; corrosion, of turbine blades, 299 ; crack propagation and detection, 188 ; cracks in hoist drums, 186 ; cumulative damage, 292 ; damage study, 291; design of automobile parts for, 291 ; effect on elastic modulus, 186 ; effect on magnetic properties, 292 ; effect of microstructure, 292 ; failure-probability statistics, 292 ; fracture, 185 ; at high temperatures, 291 ; of machinery, 291 ; metallography, 409 ; of metals, 302 (*Book*) ; physics of, 291 ; relation with plastic deformation, 186 ; resistance by favourable stresses, 291 ; review, 291, 409 ; rupture micromechanism, 85 ; in ships, 291 ; stress effects, 85 ; structural changes in, 186; theory of, 185 ; transmission temperature in, 292

Fatigue Strength, 85 ; heat-resisting materials, 85 ; literature review, 291 ; relation with wear, 292 ; of steels, 409

Fatigue Tests, of bolts, 291 ; on butt-welded plate, 409 ; effect of frequency, 409 ; effect of holes in sheet, 86 ; effect of specimen size, 185 ; effects of specimen size and shape, 185 ; internal-notch effect in bending, 185 ; machine, 185 ; machine weighbar, 186 ; magnetic, 186 ; methods, 185 ; proportionality-limit changes, 291 ; progressive-loading statistical analysis, 291 ; statistical interpretation, 185 ; stepped-amplitude, 85 ; strength determination, 291

Ferranti, Ltd., coremaking machine, 275

Ferrites, delta phase in austenitic steels, 316 (*Letter*) ; determination gauge, 411

Ferro-Alloys, 79, 398 ; sampling, 196

Ferrochromium, applications, 396 ; pellets in stainless production, 397 ; substitutes for, 398

Ferromagnetic Alloys, determination of silicon in, 299

Ferromagnetism, in austenitic steels, 316 (*Letter*) ; internal friction, 86

Ferromanganese, fume control in production, 198 ; production in electric furnace, 398

Ferrous Hydroxide, oxidation, 406

Ferrous Orthosilicate, heat of formation, 78

Ferrovanadium, analysis method, 92

Films, effect in hardness testing, 86 ; electrical resistance at low temperatures, 86 ; epitaxial, on single-crystal Fe, 191 ; metal, electrical behaviour, 410 ; oxide, cracking during cast-iron cooling, 277 ; oxide, on iron, 194 ; oxide, thickness determination from corrosion rate, 91 ; oxide, from tempering, 288 ; vapour-phase deposition, 84, 407

Finishing, abrasive methods, 180 ; barrel, 180, 285 ; dermatitis-preventing creams, 181 ; developments, 284, 285 ; gloss evaluation, 286 ; surface specifications, 284 ; tempering in, 288

Finland, metal-industries data, 93

Fire, extinguishers, 198

Flame Cutting, 83, 180, 281, 405 ; steel plates, 283

Flame Hardening, wire, 403

Flame Radiation, trials in Holland, 74, 164

Flames, internal-pressure effects, 292 ; luminosity and heat transfer, 164 ; luminous, optical properties, 164 ; open-hearth, studies, 397 ; oxy-acetylene. *See* Oxy-Acetylene Flames ; photometry, 164 ; pressure/velocity equation, 392 ; reversal valves, 273 ; temperature-measurement combustion furnace, 393 ; velocities in CO/O mixtures, 392 ;

Fluidity, testing, 276, 277

Fluidization, 269 ; of coal, 269 ; theory, 392

Fluorine, corrosion-resistant materials, 92

Fluorspar, British resources, 163

Ford Motor Co., automatic handling of pressings, 279 ; connecting-rod production, 279 ; zinc plating, 287

Forging, 81, 176, 278, 403 ; aircraft parts, 177 ; billet induction heating, 175 ; Cr–Mo steel, 402 ; cold, of tools, 279 ; crankshafts, 177, 279 ; in Czechoslovakia, 403 ; die, comparison with casting, 81 ; drop, in Australia, 176 ; drop, die sinking by, 176 ; drop, of hammer-rod steels, 279 ; drop horizontal, 278 ; drop, scale formation, 279 ; drop, shearing for, 177 ; fuel economy in, 393 ; horizontal impacting, 177 ; powder alloys, 408 ; study by plasticine models, 81 ; tools, 177 ; traverse and traverseless, 403 ; wheels, 82

Forging Furnaces, cast refractories, 394 ; electrical-resistance, 278 ; for high-speed heating, 277

Forging Plant, counterblow hammers, 81 ; for crankshafts, 177 ; drop-hammer die studs, 177 ; hammer foundations, 279 ; hammer foundations on springs, 278 ; hammer steels, 279 ; heavy presses, 177 ; horizontal, 177 ; hydraulic press, 177, 403 ; manipulators, 81 ; press guarding, 82 ; press hydraulic-control valves, 279 ; presses, 82 ; presses for boiler plate, 82 ; presses, quenching armour plate in, 176 ; scrap-collecting conveyor, 177 ; throatless press, 279 ; two-way presses, 278, 403

Forgings, creep properties, 293 ; drop, clipping tools, 176 ; effects of rare-earth additions, 294 ; flash removal, 82 ; flash-removal tools, 176 ; rotor, testing, 294 ; small, production, 94 (*Book*) ; testing by ultrasonics, 282 ; wet-blast finishing, 177

Foundry, accident rate in America, 277 ; apprentice training, 81 ; costing, 81 ; developments, 170 ; dust control, 277; dust control in grinding, 277 ; early, at Bridgnorth, 414 ; early cannon, in France, 93 ; electric-furnace practice, 274 ; grinding in, 275 ; health and safety regulations, 403 ; heat-transfer aspects, 398 ; mechanization, 174 ; mechanization and maintenance, 402 ; mechanization planning, 402 ; maintenance, 277 ; metal spraying in, 275 ; quality control, 277, 402 ; rationalization in Germany, 398 ; refractory fundamentals, 395 ; research, 398 ; research laboratories in France, 277, 402 ; roll, 402 ; safety, health, and air pollution, 403 ; safety programme, 277 ; steel. *See* Steel Foundry ; supervision, 402 ; ventilation system, 276 ; zircon refractories, 400

Foundry Plants, Aga Heat, Ltd., 402 ; Albion Malleable Iron Co., 80 ; Carntyne Steel Castings Co., Ltd., 173 ; Compagnie Générale d'Electricité, 276 ; Ford Motor Co. (Cleveland), 276; Goltra Foundries, Ltd., 80 ; John Harper and Co., Ltd., 276 ; Ley's Malleable Castings Co., Ltd., 400 ; Purdue University, 276 ; Wells Manufacturing Co., 276

Foundry Practice, 79, 170, 274, 398 ; bandsaw cutting, 277 ; fettling, 277 ; graphite applications, 80 ; Italian, improvement, 276 ; literature review, 170, 274 ; mechanized, 276 ; propane applications, 81 ; reminiscences, 81 ; in U.S.A., 274

Foundry Sand. *See* Moulding Sand

Fracture, 95 (*Book*) ; austenite transformation by, 412 ; in bent tubes, 85 ; brittle, cleavage strength in polycrystals 25 (*Paper*) ; brittle, in crane hook, 85 ; brittle delayed, in welded alloy steels, 282 ; brittle, effect of strain rate, 185 ; brittle, equation with crack propagation, 292 ; brittle, initiation in welded structures, 281 ; brittle, of machinery, 291 ; brittle, of mild steel, 290 ; brittle, in ships, 291 ; brittle, stress in 408 ; brittle, testing, 200, 408 ; cleavage, 184 ; crane gland-iron, 85 ; explosive, 85 ; fatigue, 185 ; low temperature, of ingot iron, 185 ; review, 291 ; steam-engine, 85

France, blast-furnace plant, 166 ; Bonpertius steelworks, 272 ; coal, coke, iron-ore, pig-iron, and steel production, import, and export data, 197 ; diesel crankshafts production, 278 ; early cannon foundry, 93 ; early ironmaking, 197 ; foundry research laboratories, 277, 402 ; induction-hardening origins, 175 ; Lorraine-ore beneficiation, 74 ; rail production, 178 ; railway-track construction, 295 ; research at IRSID, 94 ; rolling-mill progress, 178 ; special-steel industry, 197 ; standard steels, 295 ; steel foundries, 275 ; steelworks, 168

Friction, in bearings, formulae, 281 ; electrochemical reactions at high temperatures, 180 ; interfacial, in bearings, 281 ; internal, of cooled ferromagnetic substance, 86 ; on lubricated surfaces, 405 ; metal transfer in, 187 ; in metals, 199 ; in plastic compression, 183 ; relation with fretting corrosion, 185 ; review, 409 ; rolling, 186 ; study on metals and oils, 405 ; theories, 409

Fuel, analysis-results expression, 196 ; combustion in beds, 392 ; combustion calculations, 74 ; combustion-chamber pressure gauge, 164 ; combustion of coal volatiles, 164 ; combustion-losses

Fuel—*continued*
measurement, 164 ; combustion rates of solid particles, 164 ; determination of sulphur in, 93 ; economy, 392 ; economy in furnaces and forges, 393 ; efficiency, 269 ; preparation, properties, and uses, 74, 164, 269, 392 ; solid, sampling, 363 ;

Fulmer Research Institute, research work, 94

Furnaces, annealing bell-type, 176 ; annealing carbon-restoration type, 81 ; annealing clover-leaf design, 176 ; annealing, for cold strip ; annealing, fast gas type, 278 ; annealing roller-hearth, 176 ; annealing, for sheet steel, 81 ; blast. *See* Blast-Furnace ; design trends, 166 ; electric. *See* Electric Furnaces ; electroplating, heat transfer, 181 ; enamelling, 407 ; firing with methane, 165 ; forging. *See* Forging Furnaces ; fuel economy, 393 ; galvanizing, for wire netting, 407 ; gas and air reversal valves, 273 ; heat recovery, 60 (*Discussion*) ; heat-treatment. *See* Heat-Treatment Furnaces ; heating. *See* Heating Furnaces ; insulation, 271 ; linings, 169 ; malleablizing, 79 ; oil-fired, combustion control, 269 ; open-hearth. *See* Open-hearth Furnace ; reheating. *See* Reheating Furnaces ; roof-brick formulae, 166 ; rotary, bricks for, 166 ; rotary, for pig-iron production, 77 ; standardization in construction, 81 ; stress-relieving, 81

Galvanized Steel, corrosion in soil, 297

Galvanizing, automatic control, 286 ; determination of Al and Fe in bath, 196 ; determination of zinc in bath, 299 ; electrically heated pots, 286 ; electrolytic, from cyanide baths, 286 ; furnace for wire netting, 407 ; hot, of nails, 407 ; hot, practice, 286 ; hot, residues treatment, 287 ; hot, in U.S.A., 287 ; processes, 286 ; steel wire, 280 ; thin sheet, 286 ; zinc economy, 286 ; zinc recovery, 287

Gas, analysis apparatus, 196 ; analysis by dynamic method, 413 ; analysis by Onera apparatus, 300 ; blast-furnace. *See* Blast-Furnace Gas ; burner safeguards, 392 ; cleaner cyclones, 363 ; cleaners-efficiency assessment, 165 ; cleaning, 165 ; cleaning by bags and cyclones, 270 ; cleaning by disintegrators, 395 ; cleaning by Venturi washers 270 ; coke-oven. *See* Coke-Oven Gas; combustion, CO_2 recording, 414 ; combustion potential, 392 ; cupola, composition calculation, 399 ; determination of CO_2 by photometry, 196 ; determination of methane in, 196 ; determination of sulphur in, 93 ; flue, dewpoint- meter, 164 ; flue, probe for, 297 ; flue, sulphur-oxides removal, 165 ; industrial production, 198 ; in metals, 199 ; mine, properties, 165 ; producer. *See* Producer Gas ; solubility in metals, 88 ; in steel, 410 ; sulphur production from, 270 ; synthesis, analysis, 414 ; temperature-measurement probes, 75 ; velocity measurement by Pitot tube, 175 ; velocity measurement by water-cooled Pitot tube, 228 (*Letter*) ; water. *See* Water Gas

Gas Cylinders, X-ray study of walls, 89

Gas Holders, waterless, purging, 270

Gas/Metal Reactions, equilibrium attainment, 273

Gas Producers, leveller bars and agitators, 165 ; Stein-Motala, 270 ; two-stage type, 270

Gas/Solid Reactions, apparatus for study, 167

Gas Turbines, alloy properties, 88 ; applications, 280 ; materials, 189 ; materials creep testing, 293

Gating, principles, 174 ; technique, 401

Gauges, strain. *See* Strain Gauges

Gears, boron-steel, induction hardening, 175 ; gas carburizing, 403 ; heat-treatment, 278 ; induction hardening, 81, 175 ; iron-powder, for lawnmowers, 408 ; steels, 189 ; wear study by radio-isotopes, 86

Geiger Counter, in X-ray diffraction studies, 296 ; in X-ray fluorescent analysis, 92, 300

General Electric Co., heating and ventilation, 198 ; mineral-dressing laboratories, 163 ; press-shop materials handling, 82

General Motors Corp., cold-extruded rockets, 404 ; heat-treatment plant, 278

General Steel Castings Corp., sand reclamation, 80

Germany, coal-preparation costs, 165 ; coke-oven committee, 363 ; early cast iron, 93 ; electric-steel production data for Saar, 93 ; foundry rationalization, 398 ; furnace-construction standardization, 81 ; mining in South Baden, 391 ; non-destructive testing, 188 ; open-hearth repair and maintenance, 373 (*Paper*), 382 (*Discussion*) ; rail production in Saar, 178 ; wartime substitutes for tungsten steels, 89

Gilbert and Bennett Manufacturing Co., galvanizing furnace, 407

Gisholt Machine Co., airless blast tumbler, 284

Glass, mould steels, 189

Goltra Foundries Ltd., plant, 80

Grain Boundaries, dislocation models, 192 ; internal measurement, 296 ; movement and diffusion phenomena, 192 ; properties and effects, 192

Grain-Size, aluminium content as index, 196 ; austenite determination, 296 ; determination in steel, 296 ; determination by X-rays, 90 ; effect of liquid-metal temperature, 400 ; effect on pearlite–austenite transformation, 192 ; effect of recrystallization, 297 ; of sprayed metals, 288

Graphite, colloidal, in forming, 279 ; crystal distortion in cast irons, 191 ; Delanium, 270 ; effect on cast-iron strength, 295 ; effect of magnesium in cast iron, 171 ; formed, 270 ; foundry uses, 80 ; metallurgical applications, 80 ; nodular, formation, 399 ; nodular occurrence in cast iron, 274 ; nucleation in hypo-eutectoid steels, 31 (*Correspondence*) ; thermal conductivity, 395

Graphitization, malleable-iron, effect of oxidation, 171 ; of martensite, 79 ; in nodular iron, 171

Great Britain, coking plants, 269 ; coking practice, 269 ; early steel tyres, 197 ; fluorspar resources, 163 ; hematite and manganese-ore deposits, 73 ; iron-ore mining at Corby, 73 ; iron-ore resources, 163 ; iron and steel consumption history, 301 ; shell moulding in 173

Greece, ore-production data, 93

Grey Cast Iron, Babbitt-bearing bonding, 287 ; deformation measurements, 185; hardness, 403 ; toughness study, 411 ; types, 190 ; welding to mild-steel chaplets, 401

Grey-Iron Castings, abrasiveness and machinability, 406 ; shrinkage cavities, 277 ; tolerances and specifications, 402

Grinding, abrasive-belt, 180 ; case-hardened and nitrided steels, 283 ; in castings fettling, 277 ; contact, 284 ; contour equipment, 83 ; dust control, 277, 403 ; electrolytic, of carbide tools, 406 ; for electron diffraction, 191 ; foundry applications, 275 ; monocorundum wheels for, 283 ; power and pressure formulae, 275 ; rolls, 280

Grinell Co. of Canada Ltd., foundry practice, 276

Guest Keen and Nettlefolds, Ltd., rod and bar mill, 280
Gun Tubes, pressure gauge, 164

Hadfields, Ltd., new arc furnace at East Hecla, 397
Halides, alkali, photoelectric study, 192
Hard Facing, alloys, 286 ; welding methods, 406
Hardening, austenitic stainless steel, 296 ; the 475° C. characteristics of high-alloy steels and chromium irons, 97 (*Paper*) ; effect of microstructure, 296; electric-spark, of tools, 180 ; flame, of wire, 403 ; grey iron, 403 ; induction, 278 ; induction, of axle shafts, 175 ; induction, of boron-steel gears, 175 ; induction, French origins, 175 ; induction, of gear teeth, 81 ; induction, of surfaces, 175, 278 ; in pack carburizing, 278 ; precipitation, effect of cold work, 409 ; precipitation, of stainless steels, 89 ; secondary, of high-speed steel, 223 (*Paper*) ; strain range in beams, 184 ; surface, by induction, 175, 278 ; surface, processes, 81, 292 ; temper, 186 ; work, 292 ; work, of annealed steel, 186 ; work, of crystals, 186 ; work, mechanism, 186
Hardness, austenite deformation in relation to, 347 (*Discussion*) ; concept, 409 ; effect of electrolytic polishing, 186 ; red, of high-speed steel, 223 (*Paper*)
Hardness Tests, anisotropy in, 409 ; directional-properties indication, 186 ; effect of surface films, 86 ; on electrolytic coatings, 84 ; indentation correlation, 186 ; indentation methods, 409 ; indentation patterns, 186 ; micro machines, 186, 409 ; piston method, 409
Harper (John) and Co., Ltd., foundry plant, 276
Heat, balance calculation for blast-furnace, 236 (*Paper*) ; balance in coke ovens, 269 ; conductivity, "eigenvalue" problem, 393 ; conductivity in moulding materials, 201 (*Paper*) ; engineering, 95 (*Book*) ; recovery in industrial furnaces, 60 (*Discussion*) ; regenerator efficiency calculation, 363 ; storage measurement in electric furnace, 274
Heat Exchangers, extended surfaces for, 164 ; finned-tube performance, 74
Heat Flow, in cutting, 406
Heat-Resisting Steel, 88, 293 ; ceramic coatings, 181 ; compositions list, 293 ; for gas turbines, 189 ; in mining, 411 ; pearlitic, 188 ; properties, 189 ; structural changes in welding, 406 ; types and uses, 189 ; welding, 180, 198 (*Book*)
Heat Transfer, conduction mathematics, 74 ; dimensionless groups, 164 ; effect of flame luminosity, 164 ; "eigenvalue" problem, 393 ; on flat plate surface, 277 ; foundry aspects, 398 ; in plating furnaces, 181 ; radiation, 392 ; through mould walls, 81
Heat-Treatment, 81, 175, 277, 403 ; in alloying-elements conservation, 410 ; American techniques, 277 ; in Australia, 403 ; automatic, of gears, 278 ; automatic plant for nuts, bolts, and screws, 175 ; boron-steel parts, 175 ; centralized plant for mining gear, 278 ; chain links, effects, 182 ; Cr–Mo–Ni steels, 293 ; chromium steels, 294 ; Cr–V steel tools, 81 ; continuous-cooling transformation diagrams, 33 (*Paper*) ; crankshafts, 279 ; die steels, 175 ; distortion inhibition, 278 ; effect on creep, 87 ; effect on magnetic properties of Fe–Al alloys, 187 ; gears, 278 ; hacksaws, 284 ; investment-cast steel, 411 ; isothermal, 278 ; mining gear, 403 ; oil-well casing, 403 ; plant maintenance, 278 ; practice, 303
Heat-Treatment—*continued* (*Book*) ; radio-isotopes in atmosphere study, 278 ; stainless steels, 278 ; stress-relief, effects in welds, 282 ; tank-turret handling, 81 ; whiteheart malleable castings, 79 ; wrought-iron parts, 403
Heat-Treatment Furnaces, 81, 175, 277, 403 ; electric, 258 ; gas muffle-type, 175
Heating, central chemical processes in, 195 ; cost analyses, 175 ; high-speed, in forging, 277 ; induction low-frequency, of billets, 175 ; ingots, billets, and sheet, 174
Heating Furnaces, 81, 174, 277 ; for sucker-rod ends, 175. *See also* Reheating Furnaces
Héroult (P.L.T.), education and career, 197
High-Speed Steel, carbide precipitation, secondary hardening, and red hardness, 223 (*Paper*) ; development and properties, 295 ; production, 273 ; Rollodur, 411 ; Russian, properties, 295 ; temper hardening, 186 ; tungsten replacement, 89
High-Temperature Alloys, 188, 293, 410, 414 (*Book*) ; analysis by X-ray fluorescence, 300 ; austenitic, effect of composition on warm-working characteristics, 325 (*Paper*) ; casting by lost-wax process, 173 ; Cr–Ni cast iron, 294 ; fatigue, 291 ; gas-turbine, properties, 88 ; for gas turbines, 189 ; NA22H, 188 ; properties, 85, 189 ; types and uses, 189
Holland, flame-radiation trials, 74, 164 ; metallurgical research, 301
Hot Tearing, in relation to sand hot strength, 400 ; strain theory, 277
Hot Working, rare-earth additions in, 294 ; surface defects in, 293
Hothersall (A. W.), work, 181
Hungary, ores and pig-iron production data, 93
Hüttenwerke Phoenix, centenary, 197
Hydraulic Power, control valves for presses, 279
Hydrochloric Acid, corrosion of cast iron in, 299 ; corrosion of Cr–Mo–Ni steels in, 242 (*Paper*) ; corrosion inhibition of Fe, Zn, and Cd in, 194 ; iron solution in, 194
Hydrogen, control in descaling, 284 ; determination in coal, coke, and tar, 300 ; determination in steel, 300 ; diffusion inhibitors in H_2SO_4, 285 ; effect on deformation and rupture, 294 ; effects in steel, 410 ; equilibria with liquid iron and carbon, 167 ; equilibria with liquid iron and slag, 167 ; iron-ore direct reduction by, 77 ; occlusion, effect of cold rolling, 294 ; porcelain-enamels defects initiation by, 182 ; reactions with white cast iron, 400 ; in reduction of powder-iron cores, 289; solubility in metals, 88 ; supersaturation of iron by, 88
Hydrogen Chloride, corrosion resistance of silicon steel in, 413
Hydrogen Embrittlement, in aircraft steels, 294 ; inhibitors, action in H_2SO_4 285 ; testing oil-well steels, 91
Hydrogen-Ion Concentration, slag measurements, 273
Hydrogen Sulphide, corrosion in, 195 ; corrosion cracking in wells, 91 ; corrosion inhibition under oil-well conditions, 91 ; corrosion of turbine blades in, 195 ; embrittlement of iron and steel by, 195 ; sulphur production from, 270

Illinois University, rail-rolling tests, 291
Impact, properties of high-purity Fe–C and Fe–Mn–C low-carbon alloys, 108 (*Paper*) ; strength relationship with ageing and composition, 184
Impact Tests, on cylindrical and square specimens, 183 ; notched-bar strength after ageing, 408 ; notching by test-machine pendulum, 183 ; results reproducibility, 408 ; strain patterns, 290
Imperial Chemical Industries, Ltd., plastics for foundry use, 172
Inclusions, non-metallic, 195, 398 ; in slag-treated steel, 169
Inconel, clad steels, 407 ; corrosion in H_2S and SO_2 195
India, refractories specifications, 271 ; steel-foundry practice, 174, 275
Induction Furnaces, for Cr–Ni castings, 80; for hardening, 278
Induction Hardening, 278 ; of axle shafts, 175 ; of boron-steel gears, 175 ; French origins, 175 ; of gear teeth, 81 ; of surfaces, 175, 278
Induction Heating, 175, 278, low-frequency, of billets, 175
Induction Stirring, in electric furnace, 273, 397
Ingot Moulds, effect of iron sub-zero strain ageing, 183 ; iron strain temperature effects, 185 ; practice, 315 ; production and use, 274 ; protection and maintenance, 274 ; wash for, 170
Ingots, accelerated solidification, 274 ; casting, 78 ; casting by Autopour method, 398 ; casting for seamless tubemaking, 397 ; electric furnaces for, 170 ; flame deseaming, 79 ; planing machine, 284 ; rolling before solidification, 178 ; segregated-zone deformation in rolling, 178 ; solidification, 274 ; surface defects, 274
Inspection, in America, 301 ; lamps, for, 295
Institut de Recherches de la Sidérurgie, laboratories, 94, 197 ; laboratory electric furnaces, 175
Institute of Physics, surface electron-microscopy symposium, 190
Institute of Welding, notch-bar test symposium, 199 (*Book*)
Instrumentation, blast-furnace, 396 ; blast-furnace, panels, 77 ; electronic, 184 ; electronic pyrometry, 393 ; panel design, 301
International Harvester Co., heat-treating boron steels, 175 ; shell moulding, 174, 276
International Institute of Welding, stress relief, 282
International Materials Conference, metals conservation, 93
Investment Casting, aircraft parts, 402 ; Cr–Mo–Ni steel, 411 ; in engineering, 303 (*Book*) ; investment removal by caustic soda, 173 ; lost-wax, equipment, 276 ; lost-wax, history, 276 ; lost-wax process, 276 ; lost-wax, of small parts, 276 ; lost-wax, of turbine blades, 173 ; mass-production, 402 ; stainless steel blades, 276 ; tolerances, 402
Iron, alpha, nitrogen behaviour in, 294 ; alpha, orientation relationships with cementite, 296 ; alpha phase, 297 ; alpha, transformation excitation by, 192 ; analysis, 299, 415 (*Book*) ; Armco, scaling study, 279 ; Armco, torsion texture, 296 ; atomic structure, 191 ; cast. *See* Cast Iron ; chromium. *See* Chromium Iron ; chromizing, 286 ; coating with aluminium, 287 ; coating with antimony, 287 ; cobalt–molybdenum–nickel, 297; cold-rolling effects, 294 ; corrosion in H_2S and SO_2, 195 ; corrosion inhibition in HCl, 194 ; coulometric analysis with titanic chloride, 195 ; crystal orientation in transformation, 192 ; deformed, X-ray, study, 295 ; deoxidation by titanium, 318 (*Paper*) ; dephosphorization in cupola, 399 ; desulphurization, 295, 399 ; desulphurization by soda slags, 272 ; determination with Al in galvanizing zinc, 196 ; determination by colorimetry, 299 ;

Iron—*continued*
determination of copper in, 335 (*Paper*) ; determination by ferric acetate complex, 195 ; determination in limestone, 300 ; determination in oil by spectroscopy, 196 ; determination of oxygen in, 413 ; determination in presence of V and Cr, 92 ; electrochemical properties, 194 ; electrodeposition on worn bearings, 288 ; embrittlement by H_2S, 195 ; gamma, thermionic constants, 87 ; grinding for electron diffraction, 191 ; hydrogen supersaturation, 88 ; ingot, deformation twinning at low temperatures, 296 ; liquid. *See* Liquid Iron ; magnetic after-effect on rolling, 86 ; magnetic properties, effect of oxygen, 292 ; malleable. *See* Malleable Iron ; neutron scattering, 412 ; Ni and Co precipitation from solution, 196 ; oxygen consumption by, 194 ; pig. *See* Pig Iron ; piston-ring casting, 276 ; polarization in solutions, 412 ; powder, 289 ; powder components, 84 ; powder cores, 289, 290 ; powder magnetic properties, 182 ; powder, reduction, 289 ; powder, structures with graphite, 289 ; powder, sulphur-impregnated, 289 ; quench ageing, 344 (*Discussion*) ; rust study, 194 ; scaling, 299 ; separation from Cu and Ni by O blowing, 90 ; sheet, enamels-adhesion testing, 181 ; silicon, corrosion-resistant, 171 ; silicon, single-crystal domains, 296 ; single-crystal, light figures, 191 ; single-crystal, magnetostriction and temperature, 187 ; single-crystal, oxidation, 191 ; single-crystal preparation by recrystallization, 192 ; solubilities in, 193 ; solution in HCl, 194 ; sponge. *See* Sponge Iron ; surface enrichment by W and Mo, 175, 176 ; transformation hysteresis, 192 ; welding literature review, 180 ; wrought artistic, work of Kühn, 277 ; wrought, heat-treatment, 403 ; wrought, production, 396 ; wrought, production by Lancashire process, 396 ; wüstite formation in oxidation, 195

Iron Alloys, corrosion in soils, 298 ; determination of silicon in, 299 ; formation, 193 ; intrinsic magnetization, 187 ; liquidus–solidus determinations apparatus, 212 (*Paper*) ; properties and uses, 295 ; temper brittleness in, 358 (*Discussion*)

Iron–Aluminium Alloys, effect of heat-treatment on magnetic properties, 187 ; single-crystal preparation by strain-annealing, 192

Iron – Aluminium – Cobalt – Nickel Alloys, as permanent-magnet materials, 187

Iron – Aluminium – Nickel Alloys, Alnico powder permanent magnets, 182

Iron–Arsenic–Carbon System, 412

Iron–Carbon Alloys, alpha phase, 297 ; high-purity low-carbon, tensile and impact properties, 108 (*Paper*) ; pearlite growth rate, 297

Iron–Chromium Alloys, scaling characteristics, 299

Iron – Chromium – Cobalt Alloys, rigidity modulus and temperature coefficient, 182

Iron – Chromium – Nickel Alloys, magnetic-shunt properties, 187

Iron–Cobalt Alloys, liquidus–solidus relations, 212 (*Paper*) ; order–disorder in, 193

Iron – Cobalt – Molybdenum Alloys, phases, 297

Iron – Cobalt – Vanadium Alloys, physical properties, 183

Iron–Copper Alloys, iron separation by O blowing, 90

Iron Industry, combination with coal, power, etc., industries, 197

Iron–Manganese Alloys, γ and ε phases, 91

Iron – Manganese – Carbon Alloys, equilibrium diagram, 193 ; high-purity low-carbon, tensile and impact properties, 108 (*Paper*)

Iron – Molybdenum – Nickel Alloys, phases, 297

Iron–Nickel Alloys, iron separation by O blowing, 90 ; order–disorder in, 193

Iron Niobide, separation from Cr–Mo–Ni–Nb steel, 90

Iron–Nitrogen System, phase thermodynamics, 412

Iron Ore, agglomeration in Schmidt kiln, 164 ; beneficiation developments, 392; beneficiation developments in U.S.A., 269 ; beneficiation by electrostatics, 74 ; beneficiation in Lorraine, 74, 268 ; beneficiation at Magnitogorsk, 269 ; beneficiation in Portugal, 74 ; beneficiation of quartzites, 269 ; beneficiation of taconite, 74, 268, 392 ; Brazilian export position, 197 ; chamosite, 391 ; concentrating table, 74 ; crushing, 392 ; Czechoslovakian production data, 93 ; determination of minor elements in, 196 ; direct reduction, 396 ; direct reduction by hydrogen, 77 ; direct reduction by Stürzelberger process, 396 ; evaluation formula, 391 ; fines, in coking blends, 165 ; flotation, 269 ; flotation in Russia, 269 ; French production, import, and export data, 197 ; hematite/pyrites reactions, 268 ; Hungarian production data, 93 ; ilmenite electric-furnace smelting, 77 ; Krupp-Renn process, 396 ; lean, magnetizing treatment, 163 ; limonite X-ray study, 73 ; Lorraine, analysis, 196 ; Lorraine, beneficiation, 74, 268 ; magnetic roasting, 268 ; magnetic separation in Lorraine, 74 ; magnetite. *See* Magnetite ; microscopy and photomicrography, 90 ; mining at Corby, 73 ; mining, loading elevator, 74 ; mining in Morocco, 163 ; mining, noise in, 163 ; mining in Sweden, 391 ; pellet microstructures, 74 ; pelletizing at Babbitt, 268 ; pelletizing kiln, 164 ; pellets heat hardening, 392 ; photomicrography, 90 ; preparation plant at Appleby-Frodingham, 163 ; pyrrhotite as H_2SO_4 source, 164 ; pyrrhotite roasting, 164 ; reduction by carbon in blast-furnace, 272 ; Rif, 268 ; sampling mechanically, 269 ; sampling rationalization, 269 ; sintering. *See* Sintering ; Spanish, compositions, 167 ; sulphide deposits, 392 ; Swedish exports, 93 ; taconite agglomeration, 164 ; taconite beneficiation, 74, 392 ; taconite beneficiation plant, 268 ; taconite pellets, 392 ; taconite, power requirements for processing, 164 ; taconite roasting, 74 ; testing, 269 ; Turkish production data, 93 ; wagons for, 163 ; Yugoslavian export data, 93

Iron Ore Co. of Canada, ore project, 391

Iron-Ore Deposits, Australia, 391 ; Bechuanaland, 73 ; British, 163 ; British hematite, 73 ; Canada, 268 ; Canadian project, 391 ; Cockatoo Island, 163 ; Labrador, 268 ; Manchukuo, 94 ; Minnesota, 392 ; Morocco, 73 ; Newfoundland, 268 ; Ottawa magnetite, 391 ; South America, 197 ; world, 268

Iron Oxides, determination in presence of chromium, 300 ; effect on coal reactivity, 165 ; hematite structure and antiferromagnetism, 412 ; layer structure, 194 ; magnetite. *See* Magnetite ; reducibility in sintering, 164 ; reduction by carbon in blast-furnace, 272 ; reduction study by anaglyph, 77 ; sintering, 394 ; wüstite equilibrium with gas phase, 170 ; wüstite formation, 195

Iron – Oxygen – Sulphur System, 412

Iron Pyrites, reactions with hematite, 268

Iron – Silicon – Carbon Alloys, carbides identification, 31 (*Letter*) ; phase-diagram corrections, 412 ; thermal and microscopic study, 249 (*Correspondence*)

Iron and Steel, analysis, 415 (*Book*) ; consumption history in Britain, 301 ; literature review, 301

Iron and Steel Industry, in Colombia and Peru, 197 ; European, developments, 396 ; job evaluation, 197 ; national comparisons, 93 ; Scottish, development, 301 ; Swedish, 301 ; west European, 301 ; in Yugoslovia, 197

Iron and Steel Institute, recommendations to authors, 16

Iron and Steel Making, development, 93 ; developments in U.S.A., 272 ; developments in post-war period, 197 ; oxygen in, 283 ; sulphur in, 77, 169 ; temperature measurement, 393

Iron and Steel Works, machinery, 83, 179, 280, 405,; accident prevention, 198 ; air-pollution control, 198 ; electrical distribution, 260 (*Discussion*) ; maintenance conference, 405 ; traffic control, 198, 301, 341 (*Discussion*); welded structures, 405 ; welding in maintenance, 405

Iron–Zinc Alloys, 195 ; powder properties, 407 ; powder sintering, 407

Ironmaking, developments review, 395 ; early, in China, 93 ; early, in France, 197 ; Krupp-Renn, 396 ; raw-materials permeability tests, 331 (*Paper*); in rotary kilns, 396 ; Stürzelberger process, 396 ; United States history, 197

Ironworks, early Mirandaola, 300

Isotopes, radio-active. *See* Radio-Active Isotopes

Italy, corrosion research, 194 ; foundry-practice improvements, 276 ; synthetic moulding sands, 171

Japan, induction surface hardening, 175

Jet Engines, ceramic coatings, 288 ; enamel coatings, 288 ; fuel-nozzle-cup forming, 279 ; materials creep testing, 293 ; welding in construction, 281

Kaiser Steel Corp., expansion, 272

Kalakutskii (N.V.), work on stresses, 290

Knives, production, 284

LaGrange Shell Molders, shell moulding, 276

Laboratories, creep-testing, 293 ; foundry-research, in France, 277, 402 ; mineral-dressing, 163 ; stress-analysis, 290 ; testing, 290 ; X-ray, 90

Labrador, iron-ore deposits, 268

Lacquer, brittle, stress failure, 408 ; on chromium plate, 407 ; coatings on sheet and castings, 288 ; on strip for forming, 407

Ladles, refractories, 395 ; slag, construction, 179 ; slag, Johnston-type improvements, 402 ; slag, moulding, 169; steelworks, fireclay bricks, 395 ; steelworks, teeming by Autopour method, 398

Lanthanum, effects on stainless steels, 396

Lead, clad steel, 287 ; oxygen consumption by, 194

Lead Alloys, coatings on mild steel, 287

Leys Malleable Castings Co., Ltd., foundry plant, 400

Lighting, industrial, 198 ; for inspection, 295

Lime, desulphurization of pig iron by, 77 ; determination in open-hearth slag, 414 ; kiln heat balance, 393 ; shrinkage curves, 394

Limestone, determination of Ca, Mg, and Fe in, 300
Linde Air Products Co., flame plating, 84
Liquid Iron, aluminium/oxygen equilibrium, 273 ; desulphurization by calcium carbide, 399 ; gas evolution in solidification, 399, 400 ; oxygen solubility in, 412 ; phosphorus distribution with lime-saturated slags, 78 ; reaction with SO_2 in steelmaking, 273 ; silicon equilibrium with slag and H, 167 ; surface-tension measurement, 86; treatments for open-hearth, 170
Liquid Metals, flow in runners, 401 ; gas solubility in, 88 ; sampling, 396 ; temperature measurement, 76
Liquid Steel, action on refractories, 271 ; fluidity testing, 276 ; reactions with fireclay brick, 394 ; sampling for oxygen, 78, 299 ; surface-tension measurement, 86 ; temperature measurement, 270 ; temperature measurement by mobile couple, 270
Lithium, lubricants, 280
Lubricants, 83, 179, 280, 405 ; application, 281 ; bearing, chemical changes at high temperatures, 180 ; corrosion by, 298; corrosion study by radio-isotopes, 280 ; drawing, 177 ; drawing, colloidal graphite, 279 ; flash point as criterion, 83 ; grease, wide-temperature, 405 ; lithium-base, *in rolling,* 280 ; molybdenum disulphide, 405 ; oil flow in bearings, 179, 180 ; oil polarity and film strength, 280 ; rolling-mill lithium-based, 280 ; used, determination of iron in, 196 ; viscosity effects in bearings, 180 ; wire-drawing, types and compositions, 279
Lubrication, 83, 179, 280, 405 ; bearings, *oil flow,* 179, 180 ; bearings, *formulae,* 281 ; bearings study, 83 ; fluid-film, energy equation, 179 ; hydrodynamic, *of roll-neck bearings, 353 (Discussion);* machine tools, 83 ; methods, 281 ; oil-mist, of tinning lines, 281 ; rolling-mill, 179 ; rolling-mill, organization, 404 ; slide, 405 ; slide-bearing, Reynolds number, 179
Lukens Steel Co., rammed refractories, 271
Luxembourg, metal-industry history, 197
Lysaght's (John), Ltd., blooming and billet mill, 280

Machinability, 83, 180, 283, 406 ; cast iron, improvement by cupola deoxidation, 170 ; determination, 83 ; fundamentals, 284 ; of grey-iron castings, 406 ; metallurgical aspects, 406 ; properties, 83 ; relationship with microstructure, 89, 296, ; steel at low temperatures 284 ; testing, 406
Machining, 83, 180, 283, 406 ; carbides by Method X, 289 ; deformation-zone reduction, 283 ; electric-spark 83 ; electric-spark, of carbides, 289 ; electric-spark in Czechoslovakia, 180 ; electrical methods, 283 ; electrolytic, of tensile-test specimens, 183 ; fluids, 284 ; heat flow in, 406 ; hob design, 284 ; lapping abrasives, 283 ; lapping study, 283 ; new methods, 180 ; Sparcatron, 84 ; stainless steel, 284 ; surface-quality specimens preparation, 283 ; theory and practice, 283 ; tools casting practice, 274 ; tools lubrication, 83 ; tools, U.S. industry, 94 (*Book*) ; turning surface-quality determination, 83 ; unorthodox methods, 283
Mackintosh-Hemphill Co., slag ladles, 402
Macmillan Foundries, Ltd., shell moulding, 401
Magnesia. *See* Refractory Materials
Magnesite. *See* Refractory Materials
Magnesium, anodes in cathodic protection, 298 ; determination in cast irons, 92 ; determination, colour reagent for, 92 ; determination in limestone, 300; effect on graphite formation in cast iron, 171
Magnesium Alloys, low-temperature behaviour, 88
Magnesium Oxide, production from carnallite liquor, 166 ; surface-tension determination, 76
Magnetic Alloys, structure and properties, 187
Magnetic Annealing, magnetostriction in, 409
Magnetic Crack Detection, 87, 293 ; induction method, 188 ; Magnaglo and Zyglo methods, 188 ; particle method, 293
Magnetic Properties, after-effect in cold-rolled iron, 86 ; antiferromagnetism in hematite, 412 ; coercive field, 187 ; effect of annealing, 187 ; effect of heat-treatment, 187 ; effect of oxygen, 292 hysteresis losses in silicon strip, 294 ; intrinsic, in alloys, 187 ; iron compacts, 182 ; magnetostriction in magnetic annealing, 409 ; magnetostriction/temperature in single-crystal iron, 187 ; permeability of Cr–steels, 292 ; permeability, effect of fatigue in Cr–Ni steels, 292 ; permeability, effect of oxygen, 292 ; permeability measurement, 187 ; reverse-magnetization domains, 409 ; shunt of Fe–Cr–Ni, 187
Magnetic Testing, 87 ; by A.C.-fed coil, 188 ; in automobile industry, 87 ; in crack detection, 87 ; crack detection by induction, 188 ; fatigue hysteresis, 186 ; Förster method, 188 ; standardization in Germany, 188 ; yokes for, 187
Magnetic Welding, 281
Magnetite, low-temperature transition, 296 ; Ottawa deposit, 391 ; reduction with Co and Ni oxides, 272 ; sedimentation analysis, 392 ; single-crystals growth, 191
Magnets, Alnico powder compacts, 182 ; materials calibration standards, 292 ; permanent, materials, 187
Malleable Iron , blackheart austenitic, 411 ; blackheart foundry plant, 400 ; blackheart wear, 292 ; comparison with nodular iron, 89 ; early production processes, 301 ; effect of boron, 410 ; effect of oxidation on graphitization, 171 ; foundry, 80 ; multiple moulding, 401 ; production and properties, 79 ; production, properties, and uses, 275 ; Russian literature review, 171 ; welding, 406 ; whiteheart, mottling in, 79
Malleable-Iron Castings, shrinkage cavities, 277 ; whiteheart, annealing, 79
Malleablizing, furnaces, 79 ; gas, principles, 79
Manchukuo, ore and iron industries, 94
Manganese, as alloying element in steel, 294 ; conservation, 93 ; determination, 413 ; determination with Cr and V, 92 ; determination in minerals and silicates, 93 ; electrolytic, 189 ; recovery from open-hearth slags, 79 ; thermionic constants, 87
Manganese Ore, beneficiation research, 398 ; flotation in Russia, 269 ; Hungarian production data, 93 ; mining in Morocco, 163 ; Russian production and import data, 93 ; Turkish production data, 93
Manganese-Ore Deposits, Bechuanaland area, 73 ; British, 73 ; world, 268
Manganese–Silicon Steel, effect of boron, 189
Manganese Steel, 294 ; casting, 80 ; for castings, 295 ; effect of temperature on grain-size, 400
Manganese–Vanadium Steel, carbides formation in annealing, 297
Manganous Metasilicate, heat of formation, 78
Marcelo Steel Corp., 170
Martensite, decomposition states, 296 ; effect of prequench on formation, 412; graphitization, 79 ; precipitated-cementite structure, 297 ; retained, as function of carbon content, 296 ; transformation, 90 ; transformation, austenite stabilization for, 192, 193 ; transformation without diffusion, 192 ; transformation theories, 297 ; X-ray line broadening in nickel steels, 347 (*Discussion*)
Massachusetts Institute of Technology, fatigue and fracture, 95 (*Book*)
Mayer (Jacob), work, 301
Mechanical Handling, 301
Melilite, solid-solutions study, 211 (*Paper*)
Metal/Gas Reactions, equilibrium attainment, 273
Metal Mixers, active, 78 ; life, 273 ; practice, 307 ; refractories, 395
Metal/Slag Reactions, equilibrium, 273 ; evaluation, 397 ; phosphorus distribution, 78
Metal Spinning, combination with pressing, 82
Metal Stitching, 301
Metallizing. *See* Spraying
Metallography, 89, 190, 295, 411 ; developments, 90 ; diamond-dust abrasives, 295 ; fatigue studies, 409 ; internal-boundary measurement, 296 ; iron–silicon–carbon alloys, 249 (*Correspondence*) ; photomicrography of iron ores, 90 ; slide electrolytic polishing, 191 ; sodium bisulphite as etchant, 295 ; stereographic plots, 90 ; of surface-skin structure, 190
Metallurgy, 95 (*Book*) ; ferrous problems, 294 ; research, 197 ; research techniques, 295
Metals, bonding by Chemo Tec resins, 282 ; comparator, 410 ; crystalline structure, 412 ; diffusion in, 199, 229 (*Paper*) ; electrochemical properties, 194 ; as engineering materials, 415 (*Book*) ; gas solubility, 88 ; infra-red absorption, 86 ; joining and assembling, 281 ; liquid. *See* Liquid Metals ; physical chemistry, 414 (*Book*) ; resurfacing, 283 ; single-crystal preparation, 191 ; specification code, 295; spinning and stamping, 82 ; stitching, 301 ; strength theory, 182 ; surface-tension measurement, 86 ; thermal analysis, 297 ; thermoelectric power, 186 ; transformation pressure and fusion, 192
Methane, determination, 196 ; determination in synthesis gas, 414 ; use in furnaces, 165
Mexico, steelmaking raw-materials resources, 197
Michigan Steel Casting Co., lost-wax process, 276
Microscope, developments, 411 ; features and applications, 90 ; hot-stage, 295 ; illuminating device, 90 ; iron-ore study by, 90 ; microphotometric stand, 295
Microscope (Electron), ageing structural-changes study, 120 (*Appendix*) ; Cu–SiO_2 replicas, 295 ; Field type, 90 ; reflection, 190 ; revolving stage for, 190 ; scanning, 190 ; steel-microstructure study, 191 ; in steel studies, 190 ; surface-study symposium, 190 ; techniques, 191
Mild Steel, beam plastic flexure, 183 ; chaplets welding to grey iron, 401 ; coating with lead alloys, 287 ; deformation and rupture, 190 ; effect of annealing on magnetic properties, 187 ; plate brittle-fracture test, 408 ; prestressing and structure, 190 ; sheet fatigue tests, 86 ; stress-corrosion cracking in nitrate solution, 140 (*Correspondence*), 317 (*Correspondence*) ; welding sections, 405 ; welding studs to cast iron, 406 ; work hardening, 186
Mill Scale, reclamation, 179

Mineral Resources, 73, 163, 268, 391 ; in Africa, 73 ; in Australia, 269 ; in Borneo 73 ; in Dominica, 73 ; gravity survey in Michigan, 73
Minerals, cyclone separation, 163 ; dressing laboratory, 163 ; separation by induced radio-activity, 268
Mining, corrosion- and heat-resistant steels for, 411 ; gallery arches, 73 ; gas properties, 165 ; gear centralized heat-treatment plant, 278
Minnesota Mining and Manufacturing Co., mechanical cleaning, 406
Models, in blast-furnace studies, 395 ; converter, in bath-movement studies, 168 ; cupola, in French laboratory, 402 ; cupola, in melting study, 402 ; plasticine, in forging, 81
Moisture, in coal, 269
Molybdenum, conservation, 93, 410 ; corrosion in H_2S and SO_2, 195 ; determination by potentiometry, 300 ; surface enrichment by, 175 ; 176
Molybdenum Disulphide, as lubricant, 405
Molybdenum Steel, carbides formation in annealing, 297
Morocco, iron-ore deposits, 73 ; ore deposits, 73 ; ore mining, 163 ; Rif iron ore, 268 ; steelworks and foundries, 276
Moulding, 276 ; large slag ladles, 169 ; multiple, 400 ; pulley castings, 174 ; *shell,* 174, 276 ; shell automatic, 275 ; shell, automatic machine, 174, 276 ; shell, in Britain, 173 ; shell, castings cost and properties, 401 ; shell by "Contour" method, 276 ; shell, at International Harvester Co., 174 ; *shell, of iron, 401 ; shell, machinery,* 401 ; shell, patterns, 401, 402 ; shell, at Polygram Casting Co., Ltd., 173 ; *shell, practice, 401 ; shell, precision* casting by, 173 ; shell process, 174 ; shell, resins in, 173, 174, 401 ; shell, *for small shop, 276 ; shell, of stainless* valves, 173 ; shell, of steel, 174 ; snap-flask, 173
Moulding Machines, *automatic, 275 ; in*dexing type, 401 ; jolt rockover types, 401 ; pneumatic, 173 ; for shell moulding, 174, 276
Moulding Sand, apparent thermal conductivities at high temperatures, 201 (*Paper*) ; bentonite, 172 ; bentonite advantages, 172 ; bentonite as binder, 80 ; bentonite-bonded, properties, 400 ; Bilbao, 80 ; binders, 400 ; blacking additions, 172 ; cement-bonded, 172, 400 ; characteristics, 172 ; clay-binder properties, 172 ; clay-binders testing, 80 ; clay bonding, 171 ; clay green strength, 80 ; colouring for identification, 172; compressed structures, 400 ; continuous milling, 172 ; control, 171 ; dust in, 275 ; flowability, effect on castings surface, 400 ; flowability testing, 400 ; gas-evolution testing, 80 ; handling equipment, 172 ; hot compressive strength in relation to hot tearing of castings, 400 ; iron compounds in, 172 ; lumps removal, 80 ; mix composition, 172 ; naturally bonded, 400 ; olivine, 275 ; permeability testing, 80 ; practice, 172 ; properties, 172 ; reclaimed, cleanliness testing, 80 ; reclaimed, core ramming with, 400 ; reclamation, 80, 400 ; reclamation by air scrubbing, 80 ; reclamation by wet methods, 80 ; resin binders, 400 ; silo storage, 275 ; synthetic, 172 ; synthetic, for alloy steel, 275 ; synthetic, in Italy, 171 ; testing, 172 ; testing equipment, 172 ; testing by ram, 172 ; testing standardiaztion, 171 ; unloading by conveyor, 174 ; water-glass additions, 171, 173 ; zircon, 400
Moulds, box standardization, 275 ; cast-metal, 174 ; cement-sand, 172, 400 ; cement-sand Randupson type, 173 ; Croning, 173, 174, 401 ; die-casting, fatigue, 402 ; drying in recirculation
Moulds—*continued*
stoves, 173 ; flow of cast iron in, 277; handling equipment, 172 ; heat transfer through, 18 ; ingot. *See* Ingot Moulds ; lignite-ash, 173 ; permanent refractory, 80 ; roller conveyers for, 174 ; sand, metal penetration, 402 ; sand semi-permanent, 173 ; sand, for steel casting, 80 ; sand, structure, 400; synthetic, for alloy steel, 275 ; test, for steel fluidity, 276 ; washes, 173
Nails, galvanizing, 407
National Bureau of Standards, ceramic coatings, 288 ; low-temperature brittleness, 189 ; magnetic-materials calibration standards, 292 ; nickel-plating studies, 286 ; porcelain-enamel defects study, 182 ; sub-zero strain ageing, 183
National Coal Board, centralized heat-treatment plant, 278
National Malleable and Steel Castings Co., cupola emission control, 399
National Research Council, crystals-imperfections symposium, 192
National Research Development Corporation, 798
National Supply Co., heat-treatment, 403
Neoprene, coatings, 288
Newfoundland, iron-ore deposits, 268
Nickel, conservation, 93 ; conservation in alloy steels, 189 ; corrosion in H_2S and SO_2, 195 ; determination in steel, 300 ; effects on cast-iron abrasion, 295 ; polarization in solutions, 412 ; precipitation from Fe-containing solutions, 196 ; replacement by electrolytic manganese, 189 ; thermionic constants, 87 ; titration, 196
Nickel Alloys, determination of silicon in, 299
Nickel Ore, Greek production data, 93
Nickel Plating, before brazing, 283 ; properties, 286 ; substitutes for, 286 ; temperature effect on cathode potential, 286
Nickel-Plating Solutions, *determination of* sulphate in, 196 ; impurities and purification, 407 ; throwing-power improvement, 286
Nickel Steel, corrosion cracking in H_2SO_4 wells, 91 ; martensite X-ray line broadening, 347 (*Discussion*) ; replacement by Cr–Mn steel, 411
Niobium, conservation in alloy steels, 189
Nitrates, stress-corrosion cracking of mild steels in, 140 (*Correspondence*), 317 (*Correspondence*)
Nitric Acid, corrosion of cast iron in, 299 ; corrosion of Cr–Mo–Ni steels in, 242 (*Paper*) ; corrosion of stainless steel in, 194
Nitrides, formation during creep of stainless steel, 297
Nitriding, carbo, 278 ; carbo, wear of steels, 187 ; case hardening by, 81 ; cyanide-bath, 81 ; grinding of parts, 283 ; study, 278 ; surface-enriched iron, 176 ; theory and practice, 81
Nitrogen, addition to tool steels, 294 ; behaviour in α-iron, 294 ; behaviour in converter, 272 ; determination in steel, 299 ; effect on ageing, 409 ; effect on low-temperature brittleness, 189 ; effect in steel, 410 ; effect on weld metal, 281 ; heat conductivity, 87 ; phase study with iron, 412
Nodular Cast Iron, applications, 411 ; casting practice, 399 ; in chemical industry, 195 ; comparisons with cast iron, malleable iron, and steel, 89 ; crystallization in, 79, 275 ; effect of magnesium, 171 ; effect of phosphorus, 171 ; graphite formation, 399 ; graphite formation mechanism, 171 ; graphite-formation theories, 399 ; graphite nodulation, 274 ; Japanese study, 399 ; magnesium-produced, 79 ; magnesium-treated, physical and chemical changes, 79 ; pig-iron analysis for suitability, 92 ; pig iron for, 171 ; production and applications in U.S.A., 79 ; production from cupola metal, 275 ; production health and safety hazards, 400 ; production process, 171; production, properties, and uses, 274, 400 ; properties and uses, 295 ; structure and annealing, 399 ; waterworks applications, 89 ; wear properties, 409 ; wear tests, 292 ; welding, 282
Nodular Cast Iron—*continued*
Non-Destructive Testing, 188, 293, 410 ; in Germany, 188 ; reliability and inspection, 410 ; spectroscopic, 87 ; symposium, 86, 187 ; in U.S.A., 293
Non-Metallic Inclusions, in bottom-poured acid steel, 398 ; determination, 195 ; relationship with steel quality, 274
North American Aviation Inc., stretch forming, 279
North British Locomotive Co., Ltd., steel foundry, 173
Norway, tungsten ore, 268
Nucleation, *of austenite, 192 ;* heterogeneous of graphite in hypo-eutectoid steels, 31 (*Correspondence*)
Nuts, *heat-treatment plant, 175 ;* production, 94 (*Book*) ; stainless steel, 189
Obituary Notices, 71, 159, 266, 389
Oil, determination of iron by spectroscopy, 196 ; *flash point as criterion, 83 ;* quenching, 176 ; spraying on tubes, 288 ; yield in coking, 75
Oil Wells, *casings heat-treatment, 403 ;* casings piercing, 178 ; corrosion cracking of Cr and Ni steels in H_2SO_4, 91 ; drill steels, 190 ; hydrogen-embrittlement tests for steels, 91 ; stress corrosion of tubing, 91
Open-Hearth Furnace, all-basic, 170, 271 ; *all-basic,* chrome-magnesite refractories in, 166 ; all-basic Maerz, 396 ; all-basic tilting, 396 ; automatic control *at Shotton, 169 ; bath sampling* for O content, 78 ; charge calculations, 78 ; charging, 306 ; charging procedures, 78 ; *checkers, effect of flue*dust alkalis, 396 ; chrome-magnesite bricks, 396 ; cooling, 169 ; dust control, 198 ; *factors affecting operation* and performance, 53 (*Discussion*) ; factors affecting performance, 165, 305 (*Paper*) ; *firing with coke-oven gas,* 78 ; firing with methane, 165 ; flame studies, 397 ; flow-pattern research, 273 ; *fuel input for heat-loss main*tenance, 52 (*Appendix*) ; iron pretreatment for, 170 ; oil-fired, roof inspection *after campaign, 169 ; produc*tion-time analysis, 56 ; rammed refractories, 271 ; refractories, 166, 169, 395, 396 ; refractories design, 273 ; refractories wear, 313 ; refractory bricks, 166 ; repair and maintenance in Gemany, 373 (*Paper*), 382 (*Discussion*) ; repair and maintenance in U.S.A., 378 (*Paper*), 382 (*Discussion*) ; roof-temperature measurement by photocell pyrometers, 76 ; tilting, burner for, 169 ; venturi burners, 396; water-cooling, 46 (*Paper*) ; zebra roofs, 78
Open-Hearth Process, cold-metal, productivity factors, 273 ; melt carbon in, 169 ; mixer life, 273 ; mixer refractories, 395 ; mixers, efficiency of active type, 78 ; oxygen/carbon equilibrium, 169 ; refining in runner, 396 ; slag concontrol, 169 ; teeming-temperature factors, 273
Open-Hearth Slag, basicity determination, 169 ; control at end of melt, 169 ; determination of lime in, 414 ; manganese recovery, 79 ; spiegeleisen production from, 398

Ordnance, early French foundry, 93 ; research, 290
Ore Deposits, Moroccan, 73
Ores, beneficiation developments, 392 ; crushers, 391 ; crushing analysis, 391 ; crushing theory, 74 ; determination of manganese in, 93 ; determination of vanadium in, 92 ; filtration in beneficiation, 74 ; mechanical loaders, 73 ; mining, deposit sampling, 391 ; mining in German protectorates, 73 ; mining in South Baden, 391 ; mining and treatment, 73, 163, 268, 391 ; sampling 391 ; screen analysis, 391 ; separation by induced radio-activity, 268 ; sulphide, weathering, 73 ; unloading and handling, 391 ; Yugoslavian export data, 93
Oxidation, of chromium, 195 ; chromium determination by, 195 ; of ferrous hydroxide, 406 ; of iron single crystals, 191 ; of metals and alloys, 194, 302 (*Book*)
Oxy-Acetylene Flames, in cleaning, 84 ; in deseaming, 79 ; iron-powder injection, 283 ; in resurfacing, 283
Oxygen, in arc furnace, for low-nitrogen steel, 168 ; in basic electric-steel refining, 397 ; blowing in converter, 168 ; in cast iron, 171 ; consumption by Fe, Pb, and Zn, 194 ; determination in iron in presence of sulphur, 413 ; determination by manometer, 196 ; effect on iron magnetic properties, 292; effects in steel, 410 ; in electric furnaces, 78 ; equilibrium with Al in liquid iron, 273; equilibrium with carbon in open-hearth, 169; in iron and steel making, 283 ; large-scale production and use, 198 ; liquid-steel sampling for, 78, 299; separation of iron and from Cu and Ni by, 90 ; solubility in S-containing Fe, 412 ; use in steelmaking, 78
Oxygen-Enriched Air, effect on basic Bessemer steel, 168

Packaging, 301 ; corrosion of steel in, 413
Painting, automobile-body preparation, 285 ; in maintenance, 182 ; preparation methods, 285 ; preparation by shot blasting, 284 ; wrinkle finishing, 288
Paints, dipping, 182 ; film porosity, 289 ; protective, 182, 407 ; protective primers, 195 ; spraying by electrostatics, 182 ; spraying guns, 182 ; spraying on tubes, 288
Patternmaking, circular-segment cutting, 275 ; machining in, 401 ; pattern types, 174 ; plates for thin castings, 401 ; for pulley casting, 174 ; for shell moulding, 401, 402 ; time studies, 401
Pearlite, growth rate, 297 ; transformation, effect of grain-size, 192
Permanent Magnets, materials, 292 ; testing machine, 292
Personnel, dermatitis-preventing creams, 181 ; foundry, safety training, 277 ; job evaluation in iron and steel works, 197 ; steelworks accident prevention, 198 ; steelworks relationships, 301 ; suggestion schemes, 198
Peru, iron and steel industry, 197 ; steelmaking raw-materials resources, 197
Phenol, extraction from waste liquors, 270; recovery in coking, 75
Philippines, steel plant, 170
Phosphate Coatings, protective-value enhancement, 195 ; rinse evaluation, 288 ; specifications, 288
Phosphoric Acid, solubility in basic Bessemer slags, 168
Phosphorus, analytical separation from titanium, 92 ; distribution between iron and lime-saturated slags, 78 ; effect in nodular iron, 171
Photoelastic Analysis, 184 ; Markon resin for, 184 ; of stress in notched flat bar, 408
Photometric Analysis, determination of CO_2 in gas streams, 196 ; determination of silicon, 299 ; determination of titanium, 300
Photomicrography, of iron ores, 90
Physics, metal, 199 (*Book*) ; thermodynamics, 198, 392
Pickling, 84, 180, 284, 406 ; cast iron, 285 ; cold-sheet line at Abbey, 179 ; electrolytic, 285 ; processes, 84 ; surface effects, 84
Pickling Liquor, heating coils, 285 ; heating by submerged combustion, 285 ; regeneration by ion exchange, 285
Pig Iron, basic Bessemer, refining with CO_2/O mixture, 77 ; desulphurization in runner, 77 ; desulphurization by soda slags, 272 ; determination of Al, Sb, As, Bi, Pb, Sn, and Ti in, 92 ; French production, import, and export data, 197 ; granulation, 272 ; Hungarian production data, 93 ; for nodular-iron production, 92, 171 ; production, 76, 166, 271, 395 ; production in electric furnace from ilmenite, 77 ; production in electric furnace by Lubatti process, 272 ; production in electric and low-shaft furnaces, 77 ; production in rotary furnace, 77 ; remelting, coke consumption, 77 ; sampling, 196 ; treatment for open-hearth, 170
Pipes, cast-iron, centrifugal casting, 276 ; cast-iron, production and sand-stowing, 399 ; centrifugal casting, 276 ; Cr–Mo, fabrication, 88 ; coatings testing, 84 ; large-diameter, production, 178 ; nodular-iron, 89 ; wall-thickness determination by ultrasonics, 293 ; water, coatings, 407 ; welded-joint failures, 85 ; welding in ships, 282
Piston Rings, iron, casting, 276 ; microstructural indices, 89 ; wear study by radio-isotopes, 280
Pittsburgh Coal Co., coal preparation, 74
Plasticity, friction in compression, 183
Plastics, spraying, 288
Polarographic Analysis, 413
Polishing, abrasive-belt, 180 ; electrolytic. *See* Electrolytic Polishing
Polycrystals, cleavage strength, 25 (*Paper*); preferred-orientation examination, 90
Polygram Casting Co., shell moulding, 173 ; shell-moulding machine, 276
Portugal, Jacutinga ore beneficiation, 74
Potentiometric Analysis, determination of molybdenum, 300
Pourcel (A.), education and career, 197
Powder Metallurgy, 84, 182, 289, 407 ; carbonyl-iron cores, 289 ; cermets, 182 ; in clockmaking, 289 ; developments, 84, 182, 290 ; electric furnace for, 182 ; extrusion pressing, 182 ; ferromagnetic, 289 ; forging of dense compacts, 408 ; forming machine parts, 182 ; hot pressing, 84 ; iron, 289 ; iron components, 84 ; iron cores, 289, 290 ; iron gears, 408 ; iron/graphite structures, 289 ; iron, hydrogen-reduced cores, 289 ; iron magnetic properties, 182 ; iron reduction, 289 ; iron, sulphur impregnation, 289 ; iron–zinc properties, 407 ; iron–zinc sintering, 407 ; literature review, 84 ; mass-production, 182 ; military applications, 289 ; permanent magnets, 182 ; pore-size distribution determination, 182 ; potential applications, 407 ; pressing with floating-die table, 408 ; research, 289 ; sintered carbide. *See* Sintered Carbides ; sintering contraction of non-plastic metallics, 182 ; sintering by die pressing, 182 ; sintering, powder surface activity, 182 ; sintering theory, 199 ; stainless steel filters, 289; tests, 289 ; titanium carbide oxidation, 289 ; tungsten carbide. *See* Tungsten Carbide
Precision Casting, of aircraft parts, 402 ; Cr–Mo–Ni steel, 411 ; in engineering 303 (*Book*) ; investment removal by caustic soda, 173 ; lost-wax, equipment, 276 ; lost-wax, history, 276 ; lost-wax process, 276 ; lost-wax, of small parts, 276 ; lost-wax, of turbine blades, 173 ; mass-production, 402 ; by shell moulding, 173 ; stainless steel blades, 276 ; tolerances, 402
Pressing, 81, 176, 278, 403 ; automatic mechanized handling in, 279 ; cold, force and work, 177 ; corrugated sheet, 177 ; crankshafts, 279 ; materials handling, 82 ; plastic dies for, 177 ; scrap-collecting conveyor, 177
Pressure Vessels, stress-corrosion cracking, 413
Producer Gas, from charcoal, 175 ; graphical evaluation, 165 ; high-quality generation, 363
Propane, in flame cutting, 283 ; foundry uses, 81 ; soot-bearing, emissivity, 392 ;
Purdue University, foundry plant, 276
Pyrometers, electronic instrumentation, 393 ; high-temperature thermocouple, 393 ; immersion, for open-hearth, 270; photocell, for roof-temperature measurements, 76 ; Pt/Pt–Rh thermocouples testing, 76 ; recording, glass pen for, 75 ; reflecting, for moving-surface temperature measurement, 270 ; thermocouple construction, 270 ; thermocouple switching, 270 ; tungsten/molybdenum thermocouple, 297

Quality Control, in coal preparation, 269 ; in electroplating, 286 ; in firebrick reheating, 166 ; foundry, 277, 402 ; in metal industries, 198 ; in steelmaking, 397 ; in wire drawing, 279
Quarrying, dolomite, 394 ; safety practice, 301
Quartz. *See* Refractory Materials
Quenching, ageing, effect on strain ageing in iron, 344 (*Discussion*) ; ageing of iron, 344 (*Discussion*) ; armour plate in press, 176 ; in automatic tanks, 175; effect on austenite transformation, 412 ; media, 176 ; oils, 176 ; stepped, 403 ; temper hardening in, 186

Radio-Active Isotopes, cation-adsorption study in electroplating, 85 ; in cleaning study, 285 ; container for, 87 ; crack detection by, 188 ; in gear-wear study, 86 ; in lubricants corrosion study, 280 ; in metallurgy, 278 ; types and uses, 293 ; in wear studies, 280
Radiography, auto, 191 ; auto, of boron, 300 ; comparison with other test-methods, 293 ; economics, 87 ; electron, for surface studies, 191 ; gamma, 87, 188 ; gamma, of castings, 87 ; gamma-isotope container, 87 ; gamma techniques, 188 ; of hot welds, 283 ; iridium, 410 ; penetrameters in, 410 ; radon, 86 ; sources, 86 ; standardization in Germany, 189 ; stress, 87
Rails, build-up by welding, 82 ; chromium–manganese steel, 295 ; effect of copper on corrosion, 298 ; failures in service, 291 ; joint-bar rolling-load tests, 291 ; production in Brazil, 197 ; production in France and Saar, 178 ; rolling, 280 ; rolling mill for, 404 ; rolling tests, 291 ; welded, testing by ultrasonics, 410 ; welding, 83 ; welding by flash butt, 405 ; welding by fusion pressure, 180 ; welding by thermit process, 406
Railway Wagons, Cr–Mn steel for, 441 ; iron-ore, 163 ; wheel strain gauging, 290 ; weighing machines, 290
Railways, co-operation with steel industry in Britain, 94 ; corrosion, effect of copper, 298 ; sleeper welding, 405 ; track construction in France, 295

Recrystallization, concepts, 191 ; processes, 296 ; single-crystal preparation by, 192 ; transformation in, 297
Recuperators, Austeel-Escher, trials, 60 (*Discussion* ; Escher, on high-temperature furnaces, 60 (*Discussion*) ; efficiency calculation, 363
Refractory Materials, 76, 165, 270, 393 ; attack by liquid steel, 271 ; for basic converters, 76 ; basic, selection, 395 ; blast-furnace, attack, 271 ; brick-reheating quality control, 166 ; brick-roof formulae, 166 ; brick-tests correlation, 270 ; cast, in forging furnaces, 394 ; clay analysis, 414 ; clay green strength, 80 ; cone-testing furnaces, 395 ; converter-bottom preparation method, 168 ; cupola, 274 ; determination of alumina in, 196 ; electric-furnace lining techniques, 397 ; firing-kiln heat balance, 393, 394 ; firing, waste-heat recovery, 394 ; foundry, 395 ; furnace linings, 169 ; insulating, 271, 395 ; $FeO–Al_2O_3–SiO_2$ system, 394 ; ladle brick, 395 ; $CaAl_2S_2O_8$ phases, 394 ; montmorillonite 76, 270 ; olivine, 275 ; open-hearth, 166, 271, 395, 396 ; open-hearth bricks, 166 ; open-hearth checker, effects of flue-dust alkalis, 396 ; open-hearth, design, 273 ; open-hearth roof, 169 ; open-hearth, wear, 313 ; for permanent moulds, 80 ; phase-equilibria studies, 76 ; $K_2O–FeO–SiO_2$ system, 394 ; pyrophyllite coatings, 407 ; rammed, 271 ; for rotary furnaces, 166 ; in rotary kilns, 76 ; silicates decomposition for analysis, 93 ; silicones, 166 ; specifications, 394 ; specifications in India, 271 ; steelworks, 395 ; super-duty, 271 ; testing under load, 166 ; thermal expansion, 271 ; thermal-stress failure, 271 ; vanadium sesquioxide, 166
Refractory Materials (Alumina), properties, 166 ; sintered, resistance to corrosion 76 ; thermal conductivity, 395
Refractory Materials (Carbon), blast-furnace experiences, 76 ; blast-furnace, preparation, 76
Refractory Materials (Chrome-Magnesite), 271 ; in all-basic open-hearth, 166 ; chromium pick-up in hearth due to spalling, 397 ; determination of iron oxide in, 300 ; open-hearth bricks, 396 ; Radex, 394 ; thermal-shock resistant, 166, 394
Refractory Materials (Chromite), $Cr_2O_3–FeO–SiO_2$ system, 394 ; determination of iron oxide in, 300
Refractory Materials (Dolomite), kiln heat balance, 393 ; quarrying in Australia, 394 ; in steel industry, 394
Refractory Materials (Magnesia), calorimetric studies, 394 ; fused, 165 ; shrinkage curves, 394
Refractory Materials (Magnesite), analysis, 414 ; application, 397 ; brick patents review, 166 ; Carinthian deposits, 165; catalytic activity, 394 ; caustic burners, 394 ; chemical and mineralogical constitution, 166 ; industrial development, 165 ; kiln heat balance, 393 ; production by Austrian company, 165; production from carnallite liquor, 166; Radenthein works, 165 ; thermal-shock resistant, 166, 394
Refractory Materials (Quartz), high-low inversion, 394
Refractory Materials (Silica Brick), 271 ; determination of alumina in, 196 ; kiln heat balance, 394 ; for ladles, 395; load testing, 271 ; production, 270 ; reactions with liquid steel, 394 ; spalling testing, 394 ; tests, 271
Refractory Materials (Zircon), foundry applications, 400
Refrigators, enamel spraying, 288
Reheating Furnaces, for bars, 81 ; conversion from coke-oven-gas to oil firing, 174 ; electric, 258 ; scale removal in, 174 ; slab, tests in, 175
Republic Steel Corp., Autopour teeming, 398 ; blast-furnace high-top-pressure operation, 271 ; continuous casting, 274 ; costing for cokemaking, 363
Research, corrosion, 193 ; corrosion, at Cebelcor, 194 ; corrosion, in Italy, 194; electric-smelting, 398 ; foundry, 398 ; foundry, in France, 277, 402 ; industrial, in universities, 301 ; metallurgical, 197 ; metallurgical, in America, 301 ; metallurgical, in Holland, 301 ; metallurgical, techniques, 295 ; open-hearth flow-pattern, 273 ; ore-beneficiation, 398 ; powder metallurgy, 289 ; spiegeleisen, 398 ; sponsored, 94 ; steel-foundry, 275
Reserve Mining Co., taconite beneficiation plant, 268
Resins, Chemo Tec, for bonding, 282 ; as linings and coatings, 289 ; as moulding-sand binders, 400 ; Permafil, for castings impregnation, 277 ; phenolic, for casting, 173 ; in press-die making, 177; as protective coatings, 288 ; for shell moulding, 173, 174, 401 ; synthetic, in foundry, 172 ; urea-formaldehyde, for shell moulds, 401
Rheology, fundamentals, 412
Rhodium Plating, 288
Riveting, copper-clad plate, 83
Rockets, cold extrusion, 404
Rod, drawing, 403 ; elastic-moduli determination, 408 ; magnetic-permeability testing, 187 ; mill, 280 ; Rendleman mill, 404 ; residual-stress determination, 184 ; sucker, end heating, 175
Rolled Sections, angles, 178 ; Bauschinger effect, 85 ; beam design, 85 ; beam plastic flexure, 183 ; beam strain hardening, 184 ; beams, broad-flange rolling at Cargo Fleet, 339 (*Discussion*) ; girder welding under load, 405 ; mild-steel, welding, 405
Rolling, 82, 178, 280, 404 ; angles, 178 ; broad flange beams at Cargo Fleet, 339 (*Discussion*) ; cold, effect on density and hydrogen occlusion, 294 ; cold, effect on welding, 411 ; cold, magnetic after-effect, 86 ; cold-strip, slip in, 179 ; cold-strip, speed-dependent variables, 353 (*Discussion*) ; cold-strip, thickness control by "T" method, 353 (*Discussion*) ; cold-strip, thickness control by tension variation, 353 (*Discussion*) ; defects in, 178 ; freshly cast ingots, 178 ; gauge control, 83 ; horse shoes, 404 ; pressure dynamometry, 82 ; rail fishplates, 404 ; rails, 280, 404 ; rails in France and Saar, 178 ; rails, tests, 291 ; reduction calculation, 178 ; scale reclamation, 179 ; segregation development, 178 ; strain-gauge applications, 280 ; strip, gauge control, 179 ; strip-width controller, 178
Rolling Mills, 82, 178, 280, 404 ; accident prevention, 198 ; bar-mill plant, 178 ; blooming and bar, at Normanby Park, 280 ; blooming, mechanical problems, 404 ; at Broken Hill Pty. Co., 280 ; cold-sheet, at Abbey, 179 ; cold, for silicon-steel and stainless strip, 280 ; continuous compared with open, 280 ; efficiency factors, 404 ; electrical-drive regulators, 178, 404 ; electrical drives, 179, 404 ; electrical drives at Abbey, 404 ; electrical equipment, 280 ; electrical equipment at Port Talbot, 83 ; electrical rectifiers, 178 ; French progress, 178 ; light-section, at Darlington, 280 ; lithium-based lubricants, 280 ; lubrication, 179 ; lubrication by lithium-based grease, 280 ; lubrication organization, 404 ; open compared with continuous, 280 ; rail, at Gary, 404 ; reversing, small, 404 ; rod and bar, at Guest Keen and Nettlefolds, 280 ; rod, Rendleman type, 404; Sendzimir cold reversing, 178 ; Sendzimir, for ultrathin strip, 411 ; slabbing, at Shotton, 280 ; strip, design,
Rolling Mills—*continued*
404 ; strip, new, at S.A. des Laminoirs, 404 ; strip, at Londoz, 178 ; tube, 280; tube precision, 179
Rolls, bearings, 178 ; cast, ultrasonic testing, 87 ; casting in Yugoslavia, 81 ; foundry for, 402 ; grinding, 280 ; neck-bearing hydrodynamic lubrication, 353 (*Discussion*) ; processing problems, 179
Rupture, effect of hydrogen, 294 ; effect of temperature, 88 ; fatigue, micromechanism, 85; microcinematographic study, 190 ; testing tubular specimens, 88 ; time/temperature relationships, 88 ; Ti-stabilized stainless steel, 88
Russia, automatic welding, 406 ; cupola design and operation, 170 ; high-speed steels, 295 ; iron-ore beneficiation at Magnitogorsk, 269 ; malleable-iron literature, 171 ; manganese-ore production and import data, 93 ; ore flotation, 269 ; steel-castings production, 80
Rust, formation mechanisms, 91 ; morphology, 194 ; protective coatings, 194 ; resistant steels, 91

Salt Baths, cyanide, for nitriding, 81 ; electrode, in heat-treatment, 81
Sampling, 166 ; apparatus for, 391 ; coal, 165 ; iron ore, 269 ; liquid metals and slags, 396 ; liquid steel for oxygen, 78, 299 ; mechanical, of iron ore, 269 ; mechanical, of metals, 300 ; ore deposits, 391 ; ores, 391 ; pig iron, steel, ferro-alloys, and scrap, 196 ; solid fuels, 363
Saws, effect of heat-treatment, 284
Scale, formation in forging, 279 ; formation on hot-worked steels, 293 ; of iron, study, 299 ; iron–chromium alloys, 299 ; mill reclamation, 179 ; removal in reheating furnaces, 174
Scotland, iron and steel industry development, 301
Scrap, baling system, 177 ; blast-furnace, coke consumption in remelting, 77 ; collection from presses, 177 ; in cupola, 170 ; sampling, 196 ; sampling mechanically, 300 ; sorting by magnetics, 188 ; swarf disposal, 284 ; uranium contamination, 170
Screws, heat-treatment plant, 175 ; stainless steel, 189
Sendzimir Rolling Mills, cold reversing, 178 ; for ultrathin strip, 411
Shafts, axle, induction hardening, 175 ; axle, upset-forging tools, 177 ; failures, 85 ; internal stresses and fatigue, 291 ; torsion hysteresis, 183 ; turbine, failure, 85 ; welded, failure, 83, 85
Shearing, in drop forging, 177 ; plate, cost analysis, 405 ; steels for blades, 89
Sheet, alloy-steel creep-rupture tests, 88 ; corrugation, 177 ; fatigue tests, 86 ; lacquering, 288 ; surface-topography study, 296 ; thickness determination by ultrasonics, 188
Sheet Steel, annealing furnace, 81 ; clad, 407 ; cold rolling at Abbey, 179 ; drawing hollow bodies from, 82 ; gauge control in rolling, 83 ; magnetic-testing yokes, 187 ; problems, 294 ; silicon, hysteresis losses, 294 ; weldability tests, 282
Sheffield Steel Corp., bar mill, 178
Shells, cupping and cold drawing, 177 ; redrawing, 178
Ships, brittle fracture and fatigue, 291 ; early iron, 197 ; oil-tanker corrosion, 413 ; oil-tanker corrosion inhibition, 413 ; pipeline welding, 282 ; steels for, 396 ; welding bolts to, 406 ; welding cracks, 281
Shot Blasting, descaling stainless steel by, 284 ; in preparation for painting, 284 ; shot testing, 284 ; wet, of forgings, 177
Shot Peening, handbook, 290
Sigma Phase, formation retardation, 296

Silicates, decomposition for analysis, 93 ; determination of manganese in, 93
Silicochromium, applications, 396
Silicon, blast-furnace equilibria, 167 ; determination by photometry, 299 ; reduction from blast-furnace-type slags, 272
Silicon Carbide, heating elements, 395 ; paper in cleaning, 406
Silicones, as refractories, 166 ; in rust prevention, 164
Siliconizing, surface-enriched iron, 176
Silicosis, dust concentration in, 81
Silver, corrosion in H_2S and SO_2, 195
Sinter, chemical constitution, 131 (*Paper*) ; permeability tests, 333
Sintered Carbides, machining by Method X, 289 ; wire-drawing dies, 404
Sintering, bed permeability 136 (*Paper*) ; iron-oxide reducibility, 164
Sintering Plant, types, 164
Slabs, reheating-furnace tests, 175
Slag/Metal Reactions, equilibrium, 273 ; evaluation, 397 ; phosphorus distribution, 78
Slags, basic steelmaking, gravimetric determination of sulphur in, 28 (*Paper*) ; basicity determination by semi-micro method, 78 ; Bessemer high-manganese, production from spiegeleisen, 398 ; Bessemer, P_2O_5 solubility, 168 ; blast-furnace, Si/H/Fe equilibria 167 ; blast-furnace, silicon reduction from, 272 ; determination of vanadium in, 92 ; early ironmaking in France, 197 ; electric-furnace, for open-hearth steel treatment, 169 ; FeO–MnO–SiO_2 system, 397 ; lime-saturated, phosporous distribution with, 78 ; melilite solid solutions, 121 (*Paper*) ; open-hearth, basicity determination, 169 ; open-hearth, control, 169 ; open-hearth, determination of lime in, 414 ; open-hearth, manganese recovery, 79 ; *p*H and conductivity measurements, 273 ; sampling, 396 ; silicates decomposition for analysis, 93 ; soda, desulphurization and dephosphorization by, 272 ; thermodynamics, 273 ; treatment and use, 167 ; vanadium, analysis, 92
Slovakia, mining and metal industries, 93
Soaking Pits, 81, 174, 277 ; gas-velocity measurement by Pitot tube, 175
Société Anonyme John Cockerill, blast-furnace charging by conveyor belt, 167 ; coke-oven plant, 269
Société Anonyme D'Experance Longdoz, coke-oven plant, 269 ; strip mill, 278
Société Anonyme des Laminoirs, hot-strip mill, 404
Société Française de Metallurgie, 301
Society of Automotive Engineers, shot-peening manual, 290
Sodium Bisulphite, as etchant, 295
Sodium Chloride, desulphurization of iron by, 77
Sodium Hydride, in descaling, 406
Solar Aircraft Co., ceramic coatings, 288
Soldering, practice, 283
Solidification, accelerated, of ingots, 274 ; cast-iron, gas evolution during, 277, 399, 400, 402 ; cast-iron, oxide-film cracking during, 277 ; cast-iron study, 277 ; of castings, 398
Sorby (Henry Clifton), work, 93
South Africa, coking plant at Vryheid, 363; electric furnace, 397
South America, steel consumption and production, 197 ; steelmaking raw-materials resources, 197
Spain, Aviles steelworks, 272 ; iron-ore compositions, 167 ; moulding sands, 80 ; non-metallic inclusions in steels, 274
Special Steels, 294 ; behaviour, 295 ; in clock and watch industry, 189 ; French industry, 197 ; use examples, 411
Spectrochemical Analysis, 196 ; determination of boron by, 196 ; determination of iron in oil, 196 ; excitation unit, 196 ; powdered-samples technique, 196
Spectrographic Analysis, 196 ; alloy steels, 196 ; carbon electrode for, 299 ; concave grating for, 196 : determination of nitrogen in steel, 300 ; instruments, 413 ; X-ray, 299
Spectrophotometric Analysis, developments 195 ; split-beam detector, 413
Spectroscopic Analysis, alloy steels, 92
Spiegeleisen, manganese separation from in converter, 398 ; production from open-hearth slag, 398
Sponge Iron, analysis of, 300 ; processes, 396 ; production for copper precipitation, 272
Spraying, aluminium on steel, 287 ; aluminium on steel tubes, 287 ; enamel, 288, 407 ; metal build-up by, 289 ; metal, electrical apparatus for, 287 ; metal, in foundries, 275 ; metal, grain-size considerations, 288 ; metal, processes, 289 ; oils on tubes, 288 ; paint by electrostatics, 182 ; paint on tubes, 288 ; pistols for, 182 ; plastic coatings, 288 ; zinc on steel tubes, 287
Spring Steel, crack detection by magnetic induction, 188
Springs, bar pointing, 279 ; coil, elasticity determination, 89 ; electroplating, 181 ; flat, fatigue testing, 185 ; materials elasticity determination, 89 ; precision design, 89 ; steel, for forge-hammer foundations, 278
Stainless Steel, austenitic, δ-ferrite phase in, 316 (*Letter*) ; austenitic, ferrite-determination gauge, 411 ; austenitic, replacement by chromium steel, 293 ; austenitic, structural hardening, 296 ; in bolt, nut, and screw industry, 189 ; brazing, 283 ; clad, 407 ; clad aluminium, 287 ; clad, vacuum-brazed bond, 283 ; continuous casting, 274 ; corrosion in H_2S and SO_2, 195 ; corrosion in nitric acid, 194 ; corrosion in oxidizing solutions, 299 ; corrosion resistance, effect of electrolytic polishing, 180 ; corrosion resistance in H_2SO_4, 299 ; descaling by shot blasting, 284 ; effects of cerium and lanthanum, 396 ; elasticity, 183 ; electropolishing, 285 ; ferrochromium pellets in production, 397 ; ferrochromium substitutes in production, 398 ; forming for jet-engine cups, 279 ; fusion cutting, 83 ; heat-treatment and selection, 278 ; intergranular-corrosion susceptibility testing, 413 ; lost-wax moulding, 276 ; machining, 284 ; in mining, 411 ; niobium-stabilized, carbides behaviour, 297 ; nitrides formation during creep, 297 ; powder filters, 289 ; precipitation-hardened, 89 ; production development, 397 ; roll grinding for, 280 ; selection and heat-treatment, 278 ; spot-welding defects, 282 ; strip mill, 280 ; structure and heat-treatment, 294 ; Swedish, 89 ; symposium, 190 ; TRC, 411 ; titanium-stabilized, creep and rupture, 88 ; tube descaling, 406 ; valves shell moulding, 173 ; weld metal, 83 ; welding, 198 (*Book*). *See also* Chromium, *etc.*, Steel
Stamping, 81, 176, 278, 403 ; armatures, 403 ; Carlite coating for, 403 ; combination with metal spinning, 82 ; corrugated sheet, 177
Statistical Analysis, of fatigue tests, 185, 291
Steam, in annealing and tempering, 403
Steam Plant, control rooms, 392 ; crankshaft fracture, 85 ; lagging-thickness nomograms, 76 ; pipe-joint failure, 85
Steel, 415 (*Book*) ; aircraft, 89, 294 ; alloy. *See* Alloy Steel ; analysis, 299 ; analysis by X-ray fluorescence, 92 ; bainite formation in, 347 (*Discussion*);
Steel—*continued*
banded structure, 191 ; Bessemer. *See* Bessemer Steel ; bonding to aluminium, 287 ; boron, 175, 294, 396 ; brass brazing to, 283 ; cast. *See* Cast Steel ; chromium. *See* Chromium Steel ; clad. *See* Clad Steel ; colour coding, 89 ; comparison with nodular iron, 89 ; continuous casting, 170, 274, 398 ; copper-bearing, 298 ; determination of aluminium nitride in, 299 ; determination of boron in, 300 ; determination of boron by spectrochemistry, 196 ; determination of chromium in, 300 ; determination of chromium during melt, 92 ; determination of cobalt in, 92 ; determination of copper in, 335 (*Paper*) ; determination of hydrogen in, 300 ; determination of nickel in, 300 ; determination of nitrogen in, 299, 300 ; determination of non-metallic inclusions in, 195 ; determination of sulphur by colorimeter, 92 ; determination of titanium by colorimetry, 92 ; determination of zirconium in, 195 ; die, 175. 276 ; die-block, 189 ; duplex structure, 191 ; early, in Great Britain, 197 ; effects of oxygen, 410 ; effects of titanium, 410 ; electric. *See* Electric Steel ; French production, import, and export data, 197 ; galvanized, corrosion in soil, 297 ; heat-resistant. *See* Heat-Resisting Steel ; high-speed. *See* High-Speed Steel ; high-sulphur, production, 396 ; high-temperature behaviour, 293 ; hypo-eutectoid, graphite nucleation in, 31 (*Correspondence*) ; identification methods, 188 identification by sparking, 188 ; identification by steeloscope, 300 ; identification tests, 300 ; inclusions. *See* Inclusions ; liquid. *See* Liquid Steel , low-temperature, 88; low-temperature behaviour, 88 ; low-temperature tests; 88 ; magnetic properties, 187 ; manganese. *See* Manganese Steel ; mild. *See* Mild Steel ; nickel. *See* Nickel Steel ; nitriding, 81, 187, 278, 283 ; non-metallic inclusions. *See* Non-Metallic Inclusions ; pickling, 84, 180, 284, 406 ; physical constants at high temperatures, 94 (*Book*) ; production, 77, 168, 272, 396 ; quenching, 175, 176, 186, 403 ; refining in runner, 396 ; rimming, effects of vanadium or chromium on strain ageing, 9 (*Paper*) ; rimming, production, 273 ; sampling, 196 ; for shear-making, 89 ; sheet. *See* Sheet Steel ; shipbuilding, 396 ; silicon, 189 ; silicon, corrosion resistance in HCl, 413 ; South American production data, 197 ; special. *See* Special Steels ; spring. *See* Spring Steel ; stainless. *See* Stainless Steel ; standard French, 295 ; structural. *See* Structural Steel ; surface enrichment with W and Mo, 175 ; teeming-temperature factors, 273 ; tool. *See* Tool Steel; transformer. *See* Transformer Steel ; treatment with electric-furnace slag, 169 ; tungsten. *See* Tungsten Steel ; valve, 189 ; valve, induction-furnace melting, 80 ; wire. *See* Steel Wire
Steel Bars, area reduction in drawing, 83 ; crack detection by magnetic induction, 188 ; mill plant, 178 ; pointing, 279 ; reheating furnace, 81; twisted yielding, 290
Steel Castings, cleaning, 81 ; feeder-head losses, 80 ; feeder heating by electricity, 80 ; heat transfer through moulds, 81 ; high-quality production, 400 ; induction furnace for, 80 ; materials engineering, 171 ; precision, foundry for, 80 ; production efficiency, 80 ; production in Russia, 80 ; repair by welding, 283 ; riser

Steel Castings—*continued*
positioning, 173 ; sand moulds for, 80; shell moulding, 174 ; surface defects, 402 ; techniques, 174
Steel Company of Wales, Ltd., Abbey cold-sheet mill, 179 ; Abbey power-supply equipment, 404 ; Abbey rolling-mill drives, 404 ; Abbey telecommunications systems, 301 ; Port Talbot rolling-mill electrical equipment, 83 ; tinplating at Trostre, 287
Steel Cylinders, impact testing, 183 ; residual-stress determination, 290 409,; X-ray microscopy, 89 ;
Steel Foundry, fettling shop, 80 ; in France, 275 ; health and safety regulations, 403 ; Indian practice, 174 ; jobbing, 275 ; practice, 173 ; practice fundamentals, 275 ; practice in India and America, 275 ; research, 275 ; small, for precision castings, 80 ; work of Mayer, 301
Steel Industry, personnel relationships, 301
Steel Plates, bending machines, 179; boiler, press for, 82 ; brittle-fracture test, 408 ; clad, 407 ; copper-clad, welding and riveting, 83 ; flame cutting, 283 ; shearing-cost analysis, 405 ; strain-gauge technique, 184 ; surface-heat transfer, 277 ; welded, fatigue tests, 409 ; welding stresses, 83
Steel Strip, annealing, 176 ; annealing in bell-type furnaces, 176 ; annealing furnaces, 176 ; annealing in roller-hearth furnace, 176 ; continuous thickness measurement, 86 ; drawing theory, 82 ; electrolytic cleaning, 178 ; enamelled or lacquered, for forming, 407 ; mechanical cleaning, 406 ; problems, 294 ; rolling, 178, 179 ; rolling slip, 179 ; speed-dependent variables in rolling, 353 (*Discussion*) ; thickness control by "T" method in cold rolling, 353 (*Discussion*) ; thickness control in rolling, 83, 179 ; thickness control by tension variation in cold rolling, 353 (*Discussion*) ; ultrathin, 411 ; width control in rolling, 178 ; yielding between smooth dies, 177
Steel Tubes. *See* Tubes
Steel Wire, air cooling in patenting, 82 ; copper plating, 407 ; creep and relaxation, 293 ; effects of drawing and annealing on rigidity, 182 ; galvanized, 280 ; preplated for drawing, 84 ; production, 302 (*Book*) ; properties, 190 ; properties for rope, 411
Steelmaking, American history, 197 ; in Czechoslovakia, 170 ; developments in U.S.A., 396 ; dolomite in, 394 ; early, 301 ; electric, research at U.S. Bureau of Mines, 398 ; new techniques, 168 ; from ore to ingot, 1 (*Paper*) ; quality control, 397 ; raw-materials resources in South America, 197 ; refractories, 395 ; work analysis, 77
Steelworks, accident prevention, 198 ; crane-control systems, 179 ; electrical generators, 179 ; fire-fighting equipment, 198 ; maintenance, 301 ; maintenance, chromium plating in, 181 ; melting-shop, factors affecting performance, 305 (*Paper*) ; plant at Anor, 168 ; plant at Armco, 168 ; plant defects elimination, 280 ; plant at Fairless, 168 ; plant at St. Francois, 168 ; traffic at Appleby-Frodingham, 341 (*Discussion*) ; traffic control by radio, 198 ; train arrivals, handling costs, and the holding and storage of raw materials, 341 (*Discussion*)
Stewarts and Lloyds, Ltd., blast-furnace skip bridge, 167 ; electrical equipment for tubemaking, 179
Strain, ageing, effects of vanadium or chromium in rimming steels, 9 (*Paper*) ; ageing, of iron and steel, 409; ageing, sub-zero, 183 ; effect of rate on brittle fracture, 185 ; hardening range in beams, 184 ; hot tearing by, 277 ; in impact tests, 290 ; post-yield,
Strain—*continued*
determination, 184 ; temperature effects in ingot iron, 185
Strain Gauges, accelerometers and pressure transmitters, 290 ; construction and operation, 184 ; electronic, 290 ; foil-type, 409 ; for plates, 184 ; post-yield determinations by, 184 ; residual-stress determination in cylinders, 409 ; rolling and forming applications, 280 ; wheels testing under load, 290 ; use, 409
Stress, concentration in notched flat bar, 408 ; determination in bearings, 83 ; determination in cranes, 83 ; effect of ageing in beams, 85 ; effect on ductility, 408 ; effect of prolonged storage, 183 ; effect of size and shape, 184 ; effect on steel structure, 190 ; fatigue, effects, 85 ; gauging by frequency modulation, 290 ; in grey iron, 185 ; internal, work of Kalakutskii, 290 ; internal, X-ray measurement, 290 ; limit determination, 291 ; radiography, 87 relationship with brittle fracture, 408 ; relaxation effects in ionic crystals, 192 ; relaxometer, 183 ; residual, in cast iron, 402 ; residual, control in weldments, 281 ; residual, determination in cylinders, 290, 409 ; residual, determination methods, 184 ; residual, determination by Sachs method, 184 ; residual, determination by turning, 184 ; residual, effect of temperature increase, 85 ; residual, fading, 291 ; residual favourable, for fatigue resistance, 291 ; residual induced, 185; residual, nature, origin, and effects, 184 ; residual in welded plate, 83 ; rupture test for tubes, 88 ; shear, in body-centred cubic lattices, 296 ; tensile, from dislocations, 290 ; welding, 83
Stress Analysis, brittle-lacquer strain gradient, 408 ; laboratory for, 290 ; photoelastic. *See* Photoelastic Analysis
Stress Corrosion, 91 ; cracking of mild steels in nitrate solution, 140 (*Correspondence*), 317 (*Correspondence*) ; cracking of pressure vessels, 413 ; cracking susceptibility testing, 413 ; in hydrogen sulphide, 91 ; of oil-well tubing, 91 ; transgranular, in chromium–nickel stainless steels, 218 (*Correspondence*)
Stress Relief, furnace for castings, 81 ; methods, 185 ; steam treatment, 403 ; weld, heat-treatment effects, 282 ; welding, 282
Structural Steel, alloy-elements conservation, 89 ; beam ageing and Bauschinger effect, 85 ; beam design, 85 ; beam plastic flexure, 183 ; beam strain hardening, 184 ; brittle strength, 290; corrosion protection, 194 ; protective coatings, 193 ; stress-corrosion susceptibility testing, 413 ; weld corrosion, 194 ; welded, brittle-fracture initiation, 281
Structures, rigidity test, 87
Sulphate, determination in nickel-plating baths, 196
Sulphur, 199 (*Book*) ; behaviour in iron and steel making, 169 ; corrosion by aqueous suspensions, 298 ; determination in basic steelmaking slags, 28 (*Paper*) ; determination in coal, 196 ; determination in fuels, 93 ; determination in liquids and gases, 93 ; determination in steel by colorimeter, 92 ; impregnation of iron powders by, 289 ; in iron and steel making, 77, 169 ; liquidus with Fe and O, 412 ; production from coke-oven gas, 270 ; production from H_2S, 270
Sulphur Dioxide, corrosion in, 195 ; liquid, corrosion in, 195 ; reaction with liquid iron in steelmaking, 273
Sulphur Oxides, removal from flue gas, 165
Sulphuric Acid, corrosion of cast iron in, 299 ; corrosion of Cr–Mo–Ni steels in, 242 (*Paper*) ; corrosion resistance of stainless steel in, 299 ; embrittlement inhibitors action in, 285 ; production from pyrrhotite, 164
Summers (John) and Sons, Ltd., blast-furnace instrument panels, 77 ; open-hearth automatic controls, 169 ; slabbing mill at Shotton, 280
Superheaters, tubing corrosion, 92
Supersonic Testing, 87, 188, 410 ; apparatus, 87 ; Belgian method, 87 ; of cast rolls, 87 ; comparison with other test-methods, 293 ; crack detection, 87 ; error sources, 87 ; forgings, castings, and welds, 282 ; physico-metallurgical considerations, 87 ; in water, 410 ; welded rails, 410 ; of welds, 282
Supersonics, cleaning by, 285 ; coating-thickness determination by, 293 ; generation, 410 ; in industry, 293 ; metallurgical applications, 410 ; pipe-wall thickness determination, 293 ; thickness determination by, 188
Surface Combustion Corp., gas heat-treatment furnace, 175
Surface Finishing, specifications, 284
Surface Hardening, by induction, 175, 278; processes, 81, 292
Surfaces, decarburization, 411 ; electron microscopy, 190 ; electron radiography, 191 ; examination methods, 190 ; flat plate, heat transfer on, 277 ; gloss evaluation, 286 ; interfacial tensions of single-phase solids, 192 ; interferometry, 283, 284 ; interphase interfaces, 192 ; moving, temperature measurement, 270 ; pickling effects, 84 ; profilometer, 284 ; skin-structure metallography, 190 ; tension measurement in metals, 86 ; topography study by stress/strain markings, 296 ; treatments, 285 ; turned, quality determination, 83 ; wavy deformation, 184
Sweden, crane-stress determination standards, 83 ; hot-blast cupola at Husqvarna, 399 ; iron-industry history in Ångermanland, 414 ; iron-ore exports, 93 ; iron-ore mining, 391 ; iron and steel industry, 301 ; moulding-box standard, 275 ; moulding machines, 173 ; stainless steels, 89
Symington-Gould Corp., moulding machine, 401

Tanks, turret handling in heat-treatment, 81
Tantalum, corrosion in H_2S and SO_2, 175
Tar, coal, separation and uses, 270 ; determination of carbon and hydrogen in, 300 ; recovery in coking, 75
Tata Iron and Steel Co., expansion programme, 93
Taylor Bros. and Co., Ltd., wheel forge, 82
Tellurium, addition to cast iron, 171
Temper Brittleness, aspects, 358 (*Discussion*) ; effects of arsenic and antimony, 358 (*Discussion*) ; in high-purity iron-base alloys, 358 (*Discussion*) ; literature review, 358 (*Discussion*) ; of low-alloy steels, 292 ; in weld metal, 281
Temperature Measurement, 75, 270, 393 ; cone-testing furnaces, 395 ; flames, combustion furnace for, 393 ; gas, probes for, 75 ; high-temperature techniques, 270 ; immersion pyrometer for open-hearth, 270 ; in iron and steel works, 393 ; liquid metals, 76 ; liquid steel, 270 ; of moving surfaces, 270 ; of spot welds, 282
Temperature Measurement and Control, 75, 270, 393 ; blast-furnace, 270 ; coke-oven gas-collecting chamber, 75 ; systems, 270
Tempering, austempering, steels suitability for, 295 ; in finishing, 288 ; low-temperature effects, 278 ; in steam, 403 ; time/temperature relationship to rudture and creep, 88 ; wire, 403

Tensile Tests, autographic recorders, 290 ; effect of strain rate on twinning and brittle fracture, 185 ; on high-purity Fe–C and Fe–Mn–C low-carbon alloys, 108 (*Paper*) ; hot, 293 ; necking deformation, 183 ; specimen production by electro-turning, 183 ; wire clamping, 183

Testing, 85, 182, 290, 408 ; cast-iron solidification, 277 ; alloy-steel sheet creep-rupture, 88 ; bolts cyclic fatigue, 291 ; carbonitrided steel wear, 187 ; cast-iron wear, 292 ; castings by ultrasonics, 282 ; chromium-steel bending, 290 ; coal breakability, 165 ; coal coking, 165 ; coal swelling, 75 ; coating hardness, 84 ; coatings, on pipe, 84 ; coke reactivity, 165 ; cores, 275 ; cutting tools, 284 ; electrodeposits adhesion, 181 ; electroplated coatings, 285 ; enamels adhesion, 181 ; firebrick, correlation, 270 ; firebrick load, 271 ; firebrick spalling, 394 ; forgings by ultrasonics, 282 ; iron ores, 269 ; liquid-steel fluidity, 276 ; magnetic materials, 292 ; malleable-iron wear, 292 ; moulding sand, 172 ; moulding-sand cleanliness, 80 ; moulding-sand flowability, 400 ; moulding-sand gas evolution, 80 ; moulding-sand permeability, 80 ; moulding sand by ram, 172 ; moulding-sand, standardization, 171 ; nodular-iron wear, 292 ; oil-well steels for hydrogen embrittlement, 91 ; permanent magnets, 292 ; plate brittle fracture, 408 ; powder parts, 289 ; protective coatings, 286 ; rail joint bars, 291 ; refractories under load, 166 ; rod magnetic permeability, 187 ; rotor forgings, 294 ; sheet weldability, 282 ; shot and sand abrasives, 284 ; spot welds, 282 ; stainless intergranular-corrosion susceptibility, 413 ; structural-steel stress-corrosion susceptibility, 413 ; structures rigidity, 87 ; surfaces by interferometry, 283, 284 ; tool steels by spark, 414 ; tube stress-rupture, 88 ; weldability, C.T.S. method, 281 ; weldability notch-bar, 408 ; weldability, rapid dilatation, 17 (*Paper*) ; weldability, of sheet, 282 ; welded structures, 199 (*Book*) ; welding-electrode cracking, 282 ; wire elongation, 295

Testing Machines, creep, 293 ; dynamic analysis, 85 ; extensometer for low-temperature use, 119 (*Appendix*) ; fatigue, 185 ; fatigue low-temperature, 185 ; fatigue, for small specimens, 185 ; fatigue, weighbar for, 186 ; magnetometer, 292 ; microhardness, 409 ; microhardness, limitations, 186 ; stress relaxometer, 183 ; wear, micro apparatus, 409

Tests, 85, 182, 290, 408 ; adhesion, of electrodeposits, 181 ; adhesion, of enamels 181 ; bend, fatigue failure, 291 ; bend, stress factors in notched flat bar, 408 ; bend study on chromium steel, 290 ; bend yield-point, 183 ; brittle-fracture, 408 ; brittle-fracture, of plate, 408 ; Charpy strain patterns, 290 ; coking, 165 ; combustion, CO_2 recording, 414 ; corrosion, 91 ; corrosion, in boiler flue gas, 297 ; creep, ductility in, 189 ; creep, hot, 293 ; creep, of jet-engine materials, 293 ; creep, laboratory for, 293 ; creep, machines, 293 ; creep, relationship with relaxation, 189 ; creep-rupture, of alloy-steel sheets, 88 ; cupping, for deep-drawability, 82 ; cutting, 284 ; deep-drawability, 82 ; elongation, 184 ; elongation, of wire, 295 ; explosion, 85 ; fatigue, on bolts, 291 ; fatigue on butt-welded plate, 409 ; fatigue, effect of frequency, 409 ; fatigue, effect of holes in sheet, 86 ; fatigue, effect of specimen size, 185 ; fatigue, effect of specimen size and shape, 185 ; fatigue, internal-notch effect, 185 ; fatigue

Tests—*continued*
machine, 185, 186 ; fatigue, magnetic, 186 ; fatigue, methods, 185 ; fatigue, proportionality-limit changes, 291 ; fatigue, progressive-loading analysis, 291 ; fatigue, statistical analysis, 185 ; fatigue stepped-amplitude, 291 ; fatigue-strength determination, 291 ; flame-cutting, 283 ; flowability, of moulding sand, 400 ; fluidity, 277 ; fluidity, of steel, 276 ; fluoroscopic, 410 ; hardness, anisotropy in, 409 ; hardness, directional-properties indication, 186 ; hardness, effect of surface films, 86 ; hardness, on electrolytic coatings, 84 ; hardness, indentation correlation, 186 ; hardness, indentation methods, 409 ; hardness, indentation patterns, 186 ; hardness, micro machines, 186, 409 ; hydrogen-embrittlement, of oil-well steels, 91 ; impact. *See* Impact Tests ; interferometric, of surfaces, 283, 284 ; low-temperature, 88 ; machinability, 406 magnetic. *See* Magnetic Testing ; magnetic-permeability, 187 ; notch-bar, error sources, 85 ; notch-bar relationships with performance, 408 ; notch-bar stress concentration, 408 ; notch-bar, for weldability, 408 ; notch-bar, of welded structures, 199 (*Book*) ; penetrameter, 410 ; permeability, of blast-furnace raw materials, 331 ; permeability, of cores, 275 ; permeability, of moulding sand, 80 ; ram, of moulding sands, 172 ; reactivity, of coke, 165 ; rigidity of frameworks, 87 ; rigidity, of Fe–Cr–Co alloys, 182 ; rolling, of rails, 291 ; scaling, on steel, 293 ; shatter, of coal, 165 ; solidification, of cast iron, 277 ; spalling, of firebrick, 395 ; spark, of tool steels, 413 ; spectroscopic, 78 ; stress-corrosion susceptibility, 413 ; stress-rupture, of tubes, 88 ; supersonic, 87, 188, 410 ; supersonic apparatus, 87 ; supersonic, in Belgium, 87 ; supersonic, of cast rolls, 87 ; supersonic, comparison with other methods, 293 ; supersonic, crack detection by, 87 ; supersonic, error sources, 87 ; supersonic, of forgings, castings, and welds, 282 ; supersonic, physico-metallurgical aspects, 87 ; supersonic, in water, 410 ; supersonic, of welds, 282, 410 ; swelling of coal, 75 ; tensile. *See* Tensile Tests ; torsion, 182, 183, 296 ; wear, of carbonitrided steel, 187 ; wear, of cast iron, 292 ; wear, by disappearing markings, 186 ; wear, of malleable iron, 292 ; wear, of nodular iron, 292 ; weldability, 281, 282, 408 ; weldability, rapid dilation, 17 (*Paper*) ; X-ray, 87, 187 ; X-ray, standards, 87

Textile Machinery, card-wire hardening, 403

Thermodynamics, advances, 79

Thomas (Richard) and Baldwins, Ltd., mill for stainless and silicon-steel strip, 280 ; roll processing, 179 ; silica-brick manufacture, 270 ; tinplate production, 287

Timken Roller Bearing Co., induction stirrer, 273, 397 ; lubricants-viscosity factor, 180

Tinplate, coating-thickness determination by ultrasonics, 293 ; coating thickness-determination by X-ray fluorescence, 287 ; electrolytic, multiple generator system, 279 ; electrolytic, plant lubrication by oil mist, 281 ; passivation, 195 ; production at Ebbw Vale, 287 ; production history, 93 ; production at Trostre, 287 ; training in industry, 198

Titanium, deoxidation of iron by, 318 (*Paper*) ; determination by photometry, 300 ; determination in presence of P, 92 ; effect on galvanic corrosion, 298 ; effects in steel, 410 ; thermionic constants, 87

Titanium Carbide, cermets oxidation resistance, 289

Tool Steel, alloying with nitrogen, 294 ; bars, 190 ; carbide segregation, 191 ; Cr–V, heat-treatment, 81 ; desegatized, 295 ; direct casting, 173 ; for drills, 284 ; effect of prequench on austenite transformation, 412 ; high-chromium, 411 ; methods in U.S.A., 189 ; production, 273 ; properties, 190 ; sorting by spark test, 414 ; standardization, 89 ; welding, 180

Tools, casting direct, 173 ; casting milling cutters by inversion process, 173 ; casting practice, 274 ; casting resin for, 173 ; Cr–V steel, heat-treatment, 81 ; cold forging, 279 ; cutting. *See* Cutting Tools ; electrolytic grinding, 406 ; hardening by electric spark, 180 ; machine, materials, 295 ; machine, U.S.A. industry, 94 ; sharpening by electric spark, 180 ; twist-drill performance, 284 ; wear measurement, 406 ; welding, 180

Torsion, effect on elastic modulus, 182 ; shafts hysteresis, 183 ; texture determination, 296

Toughness, grey-iron study, 411 ; low-temperature, 183

Traffic, at Appleby-Frodingham, 341 (*Discussion*) ; control by radio, 198, 301 ; train arrivals, handling costs, and the holding and storage of raw materials, 341 (*Discussion*)

Transformer Steel, refining in runner, 396 ; sheet, effects of composition and rolling, 86

Tubes, bent, cracking, 85 ; bent, tear phenomena, 85 ; Bourdon, materials selection, 89 ; electrical equipment for production, 179 ; electrostatic oiling and painting, 288 ; production, 279 ; residual-stress determination, 184 ; rolling mill for precision work, 179 ; seamless, drawing, 403 ; seamless, ingot casting in production, 397 ; seamless, large cold mill for, 280 ; seamless, metallurgical factors, 279 ; seamless, welding in production, 405 ; spraying with Al and Zn, 287 ; stainless, descaling, 406 ; stress-rupture test, 88 ; superheater, corrosion, 92 ; superheater, effects of aluminium and heat-treatments on creep, 87 ; welding, 180, 405 ; welding machine, 282

Tungsten, conservation, 93 ; corrosion in H_2S and SO_2, 195 ; surface enrichment by, 175, 176

Tungsten Carbide, flame plating on metals, 287, 288

Tungsten Ores, in Norway, 268

Tungsten Steel, creep curves, 293 ; replacement in wartime Germany, 89

Turbines, blade casting by lost-wax process, 173, 276 ; blade corrosion fatigue, 299 ; blade corrosion in H_2S, 195 ; cavitation in, 91 ; rotor-forging testing 294 ; shaft failure, 85

Turkey, chromite resources, 268 ; mining and metal industries, 93

United Aircraft Corp., forming jet-engine cups, 279

United States, accident prevention in iron and steel works, 198 ; blast-furnace design, 166 ; blast-furnace development history, 167 ; early electroplating, 286 ; electric-furnace evolution, 78 ; Frankford Arsenal research, 290 ; forming advances, 278 ; foundry-accident rate, 277 ; foundry practice, 274 ; galvanizing, 287 ; Government specification departments, 190 ; heat-treatment techniques, 277 ; inspection methods, 301 ; inspection and testing, 293 ; iron-ore benefication, 269 ; iron-ore sources, 268 ; iron, steel, and coke industries development, 197 ; iron and steel making developments,

United States—*continued*
272 ; iron sulphide deposits in Minnesota, 392 ; machine-tool industry, 94 ; metallurgical research, 301 ; mineral-resources gravity survey in Michigan, 73 ; nodular-iron production and applications, 79 ; open-hearth repair and maintenance, 378 (*Paper*), 382 (*Discussion*) ; open-hearth zebra roofs, 78 ; phosphate-coating specifications, 288 ; steel-foundry practice, 275 ; steelmaking developments, 396 ; tool-steel methods, 189
United States Bureau of Mines, coke and by-products production data, 197 ; electric-smelting research, 398 ; ore-beneficiation research, 398 ; spiegeleisen research, 398
United States Naval Research Laboratory, hot-tearing study, 277
United States Pipe and Foundry Co., centrifugal casting, 276
United States Steel Co., Fairless plant, 168 ; rail rolling at Gary, 404 ; strip-width controller, 178
United Steel Companies, Ltd., plant lubrication, 179
Universities, industrial research in, 301
Uranium, scrap contamination by, 170

Valves, stainless, shell moulding, 173 ; steels, 189
Van der Horst Corp., electroplated iron on bearings, 288
Vanadium, determination with Cr and Mn, 92 ; determination in presence of Fe and Cr, 92 ; effects on strain ageing of rimming steels, 9 (*Paper*) ; thermionic constants, 87
Vanadium Ore, analysis, 92
Vanadium Sesquioxide, refractory properties, 166
Vauxhall Motors, Ltd., induction hardening axle shafts, 175
Venezuela, steelmaking raw-materials resources, 197
Ventilation, in engineering works, 198 ; foundry, 276
Verein Deutscher Giessereifachleute, organization, 398
Vermiculite, production and uses, 395

Washington Steel Corp., shot blasting, 284
Waste Liquors, cyanide, determination of chlorine in, 300 ; metal recovery by ion exchange, 406 ; phenol extraction, 270 ; treatment plant, 270
Water, cooling-systems corrosion, 298 ; recirculated, treatment, 298 ; softening and conditioning, 301 ; treatment, 303 (*Book*) ; treatment for boilers, 298
Water Gas, charcoal-produced, 175 ; charcoal-produced in annealing and carburizing, 175
Wear, of carbonitrided steel, 187 ; of cast iron, 292 ; effects of Cr and Ni in cast iron, 295 ; of gears, 86 ; of grey-iron castings, 406 ; of malleable iron, 292 ; in metal transfer, 187 ; micro tester, 409 ; of nodular iron, 292, 409 ; product in acceleration, 409 ; relation with fatigue strength, 292 ; resistance increasing in engine cylinders, 86 ; resistant cast iron, 292 ; study by radio-isotopes, 280 ; testing by disappearing markings, 186 ; tool, measurement, 406
Weirton Steel Co., fire-fighting equipment, 198
Weld Metal, aluminium bronze, 283 ; effect of deoxidation and nitrogen, 281 ; elongation effects, 282 ; stainless steel, 83 ; temper brittleness, 281
Weldability, assessment by rapid dilatation tests, 17 (*Paper*) ; testing by C.T.S. method, 281 ; testing by notch bar, 408 ; testing sheet, 408
Welded Assemblies, 283 ; with castings, 405 ; distortion control, 281 ; distortion and stress control, 281 ; rail testing by ultrasonics, 410
Welded Structures, brittle-fracture initiation, 281 ; costs comparisons with castings, 180 ; in iron and steel works, 405 ; notch-bar testing, 408 ; notched-bar tests, 199 (*Book*)
Welding, 83, 180, 281, 405 ; arc, extrusion-press repair by, 282 ; arc, structural changes in Cr–Mo steels, 406 ; arc thermodynamics, 405; argon, of stainless steel, 283 ; austenitic corrosion and heat-resisting steels, 198 (*Book*) ; automatic, in Russia, 406 ; bolts to sheet, 406 ; chain links, 406 ; Cr–Mo steels structural changes in, 406 ; cold-pressure, 406 ; copper alloys to steel, 283 ; copper-clad plate, 83 ; effect of cold rolling, 411 ; flash-butt, of rails and sleepers, 405 ; fusion-pressure, of rails, 180 girders under tension, 405 ; grey iron to chaplets, 401 ; hard facing. *See* Hard Facing ; in jet-engine construction, 281 ; literature review, 180 ; magnetic-force, 281 ; in maintenance, 281 ; malleable iron, 406 ; methods, 281 ; mild-steel sections, 405 ; mild-steel studs to cast iron, 406 ; nodular iron, 282 ; oxy-acetylene, history, 282 ; oxy-acetylene pressure, of rails, 405 ; pipes, 282 ; pressure, 406 ; pressure processes, 180 ; pressure, of rails, 405 ; rails build-up by, 83 ; rails, flash-butt, 405 ; rails by fusion pressure, 180 ; rails by oxy-acetylene pressure, 405 ; rails by thermit process, 406 ; railway sleepers, 405 ; repair of castings by, 283 ; repair of iron and steel works plant by, 405 ; shaft failures by, 83 ; ships, cracking in, 281 ; spot, of stainless steels, 282 ; stainless steel, 282 ; stainless steel by argon arc, 283 ; stress-relief, 282 ; stresses in plate, 83 ; thermit, of rails, 406 ; tool steels, 180 ; tubes, 180 ; tubes in production, 405 ; under tensile load, 405
Welding Electrodes, developments, 282 ; heat-resisting ferritic-austenitic steel, 281 ; hydrogen-free, 282 ; magnetic testing, 188 ; nodular-iron, 282 ; testing for crack susceptibility, 282
Welding Machines, for tubes, 282
Welds, blow-holes in, 406 ; butt, fatigue strength on plates, 409 ; cast-iron, blow-holes in, 406 ; corrosion in structural steel, 194 ; delayed brittle fracture in, 282 ; electrical resistance, 282; embrittlement, 282 ; hot radiography, 283 ; mild-steel, cracking in, 405 ; pipe-joint failures, 85 ; shaft failures, 85 ; stainless steel, properties, 83 ; spot, properties, 282 ; spot, reliability evaluation, 282 ; spot, transient-temperature measurement, 282 ; stress-relief heat-treatment effects, 282 ; testing by ultrasonics, 282 ; X-ray equipment, 188 ; zone-properties study, 180
Wells Manufacturing Co., foundry plant, 276
Westinghouse Electric Corp., creep-testing laboratory, 293
Wheels, early steel tyres, 197 ; forging plant, 82 ; strain gauging, 290
White Cast Iron, formation mechanism, 193 ; hydrogen reactions with, 400 ; oxygen in formation, 171
Whitworth (Sir W. G. Armstrong) and Co., cast-roll ultrasonic testing, 87
Wild-Barfield Electric Furnaces, Ltd., induction furnaces, 278
Wire, card, hardening, 403 ; cloth and netting galvanizing furnace, 407 ; coil-handling ram, 279 ; coiler, 404 ;
Wire—*continued*
cold extrusion, 82 ; copper-steel electroformed, 407 ; damping vibration, 411 ; deformation and electrical resistivity, 187 ; effects of drawing and annealing on rigidity, 182 ; elongation tests, 295 ; industry handbook, 95 (*Book*) ; for prestressed concrete, 89 ; steel, air-cooling in patenting, 82 ; tensile-test clamping, 183
Wire Drawing, 302 (*Book*) ; coiler, 404 ; dies, sintered carbide, 404 ; effect on metal rigidity, 182 ; force and stress calculations, 82 ; lime-bath improvement, 279 ; lubricants types and compositions, 279 ; mill layout, 404 ; practice, 404 ; of preplated steel, 84 ; quality control in, 279 ; theory, 82 ; of weaving wire, 279
Wire Ropes, characteristics, 89 ; construction, 190 ; flattened-strand, 179 ; production, 82 ; wire properties, 411
Worshipful Company of Turbine Workers, educational activities, 198
Wrought Iron, artistic, work of Kühn, 277 ; heat-treatment, 403 ; production 396 ; production by Lancashire process, 396
Wüstite, equilibrium with gas phase, 170 ; formation in iron oxidation, 195
Wyman-Gordon Co., aircraft forgings, 177

X-Ray Studies, austenite transformation by fracture, 412 ; cold work, 192 ; deformed iron, 295 ; gas cylinders, 89 ; grey-iron deformation, 185 ; limonite, 73 ; magnetite transition, 296
X-Rays, analysis by, 92 ; analysis of high-temperature alloys by fluorescence, 300 ; camera, 90, 190 ; coatings-thickness determination by back reflection, 181 ; determination of austenite by, 297, 412 ; film-density differences, 90 ; fluorescent analysis of high-temperature alloys, 300 ; fluorescent, Geiger counter in, 300 ; fluorescent, in tinplate-coating gauging, 287 ; Geiger counters in, 296 ; grain-size determination, 90 ; high-voltage, 410 ; in internal-stress measurement, 290 ; laboratory for, 90 ; line broadening of martensite in nickel steels, 347 (*Discussion*) ; line-multiplication avoidance, 90 ; Patterson analysis, 296 ; powder camera, 190 ; protection against, 187 ; spectral energy distribution, 293 ; spectrograph, 299 ; spectrometry low-absorption effects, 191 ; in testing, 87, 187 ; testing aircraft-engine mounts, 293 ; testing standards, 87 ; three-dimensional, 90; tube for, 90 ; tube-voltage variations, 90 ; weld-testing equipment, 188

Yielding, in bending, 183 ; mild-steel beams, 183 ; theories, 183 ; twisted bar, 290
Yugoslavia, iron and steel industry, 197 ; metals-production data, 93 ; ore exports, 93 ; roll casting, 81

Zinc, corrosion inhibition in HCl, 194 ; determination of Al and Fe in, 196 ; determination in brass, 299 ; determination in galvanizing baths, 299 ; economy in galvanizing, 286 ; oxygen consumption by, 194 ; recovery from galvanizing residues, 287 ; spraying on steel tubes, 287
Zinc Plating, barrel machines, 287
Zinc-Plating Solutions, determination of zinc in, 299
Zircon. *See* Refractory Materials
Zirconium, determination in steel, 195

NAME INDEX

Abe, K. *See* Iitaka, I.
Abrahams, S. C., and **B. A. Calhoun,** low-temperature transition in martensite, 296
Abson, R., elected Associate, 221
Acosta, R. S. *See* Marti, F. B.
Adamson, F., elected Associate, 221
Adamson, O. J., and **H. Neumann,** Norwegian tungsten ore, 268
Ahlen, A. van. *See* van Ahlen, A.
Aiyer, K. V., wire drawing, 404
Akimov, G. V. *See* Kurtepov, M. M., *also* Lunev, A. F. L.
Al-Samarrai, S. H. K., elected Associate, 221
Albiez, G., mining in Baden, 391
Albrecht, F., pig-iron granulation, 272
Alcacer, J. N., cast-iron strength, 295
Alden, J. W., and **J. G. Mravec,** aluminium as grain size index, 196
Aldinger, L. A., stresses in castings, 402
Alexander, W. E., elected Member, 220
Alison, R. G., weld-metal elongation, 282
Allan, J. H., elected Member, 220
Allan, J. R., foundry hygiene, 403
Allen, A. H., electric melting shop, 170
Allen, D. N. de G., regenerator calculations, 393
Allen, N. P., temper brittleness, 358
Allen, N. P., W. P. Rees, B. E. Hopkins, and **H. R. Tipler,** *Paper:* "Tensile and Impact Properties of High-Purity Iron–Carbon and Iron–Carbon–Manganese Alloys of Low Carbon Content," 108
Allen, W. C. *See* Snow, R. B.
Allgood, H. Y. *See* Nash, H., jun.
Allingham, E. C., Canadian ore developments, 391
Altmann, G. O., carbonyl iron powders, 289
Amiot, P. *See* Bastien, P.
Ananthanarayanan, N. I., and **J. F. Libsch,** sintering fine ferromagnetic powders, 289
Anderson, E. F., wet blasting dies, 177
Anderson, H. H., power-plant corrosion, 92
Anderson, J. E. *See* Orchin, M.
Anderson, R. J., foundry mechanization, 402
Andrade, E. N. da C., crystal structure in metals, 412
Andrae, F. V., electric-furnace busbars, 78
Andrejev, L. *See* Tochowicz, S.
Andrews, K. F. *See* Gulbransen, E. A.
Andrews, K. W., iron-alloys formation, 193
Angel, F. *See* Awerzger, A.
Anglo-American Council on Productivity, *Book:* "Metal-Working Machine Tools," 94
Angus, H. T., carbon pick-up, 79
Anselm, W., kiln heat balances, 393
Aoki, I., nodular graphite, 171, 274
Apker, L., and **E. Taft,** alkali-halides study, 192
Appleton, A. S., elected Associate, 221
Apraiz, J., high-speed steels, 295
Aramburu-Diaz, M., elected Member, 220
Araujo, J. B. De. *See* De Araujo, J. B.
Araujo, L. A. de. *See* de Araujo, L. A.
Aravamuthan, V., ore reduction by hydrogen, 77
Arkhangel'skaya, Z. N. *See* Malinkina, E. I.
Arkharov, V. I., phase transformations, 193
Arkharov, V. I., A. K. Varskaya, M. G. Zhuravleva, and **G. I. Chufarov,** magnetite reduction in presence of Ni or C oxides, 272
Armour, J. D., continuous annealing, 81
Armstrong, A. A., hardening grey iron, 403
Armstrong, D. G., mineral dressing, 163
Armstrong, T. N., arc furnaces, 274
Arthur, D. F. *See* Sims, R. B.
Arthur, J. R., and **D. H. Napier,** combustion of coal volatiles, 164
Arthur, P., and **J. F. Donahue,** titanic chloride in coulometric analysis, 195
Arwidson, S., elected Member, 220
Asbeck, G., obituary notice, 71
Ascough, H. H., cold-sheet production at Abbey, 179
Ashby, R. H. *See* Niklewski, B. K.
Aspden, H., magnetic-permeability measurement, 187
Atterton, D. V., *Paper:* "The Apparent Thermal Conductivities of Moulding Materials at High Temperatures," 201 ; castings surface defects, 402
Aubaud, J., photoelastic resin, 184
Aubertin, F., and **C. Crussard,** thermoelectric power, 186
Aubry, J., and **F. Marion,** sponge-iron analysis, 300
Aubry, J., G. Turpin, and **G. Laplace,** Lorraine-ore analysis, 196
Auerbach, R., phase-boundary corrosion, 194
Auld, J., elected Member, 220
Austin, G. W., A. R. Entwisle, and **G. C. Smith,** *Paper:* "Effect of Arsenic and Antimony on Temper Brittleness. *Discussion,* 358. *Correspondence,* 366. *Authors' Reply,* 371
Austin, J. B., ceramics thermal expansion, 271
Austin, L. W., rotary-kiln refractories, 76
Averbach, B. L., austenite determination by X-rays, 297 ; *see also* Warren, B. E.
Avery, H. S., and **H. J. Chapin,** chromium carbide hard-facing alloys, 286
Awerzger, A., and **F. Angel,** Carinthian magnesite deposits, 165
Azou, P. *See* Bastien, P.

Babichev, M. A. *See* Rzheznikov, V. S.
Babko, A. K., and **V. S. Kodenskaya,** colorometric reagent for Fe, 299
Bablik, H., galvanizing developments, 287 ; galvanizing pots, 286
Baborovský, V. *See* Morávek, O.
Backofen, W. A., and **B. B. Hundy,** torsion textures, 296
Bacon, L. O., and **D. O. Wyble,** gravity ore surveys, 73
Badaeva, A. A. *See* Malinkina, E. I.
Badger, E. H. M., quality control, 166
Baenziger, A., elected Member, 220
Baerlecken, E., steels identification, 188
Baes, L., strength of metals, 182
Bagnall, F. T., arc furnaces, 257
Bähr, A. *See* Pepperhoff, W.
Bailey, G. B. *See* Huff, G. F.
Bain, E. C., iron and steel making, 93
Bake, L. S., neoprene coatings, 288
Baker, C. J., elected Member, 220
Baker, R. G., elected Member, 220
Baker, W. A. *See* Morrogh, H.
Ball, C. S., cold strip rolling, 355
Ballay, M., high-strength alloys, 190 ; nodular iron, 79, 295
Balyuk, S. T., and **V. M. Mirak'yan,** determination of Fe_2O_3 in presence of Cr, 300
Bamford, W. M., elected Member, 220
Bampfylde, J. W., aluminium cast iron, 89
Ban, T. E. *See* Cooke, S. R. B.
Banaschek, K. *See* Niemann, G.
Banerjee, N. G., determination of C and H in coal, 300
Baptista, A. *See* Palacios, J.
Barclay, N., elected Member, 220
Bardeen, J., and **C. Herring.** Kirkendall effect in diffusion, 192
Bardenheuer, P., gases in metals, 88
Bardgett, W. E., award of Hadfield medal, 220
Bardolle, J., and **J. Bénard,** iron single-crystal oxidation, 191
Bargezi, E., magnesite industry, 165
Bargiel, A. *See* Jankowski, A.
Barinov, N. A., V. P. Mizikin, and **E. M. Blank,** water-cooled cupolas, 170
Barking, H., and **C. Eymann,** iron-rich coke, 165
Barnard, M. F., ore traffic, 342
Barney, J. E., and **W. A. Kimball,** determination of Fe in oils, 196
Baron, J., refractories tests, 166
Barr, W., and **I. M. Mackenzie,** notch-bar weldability tests, 408
Barreiro, L., early iron and steel, 301 ; old Mirandaola ironworks, 300
Barret, H., chrome-magnesite open-hearth refractories, 396 ; producer gas, 393
Barrett, C. S., crystal imperfections, 192
Barrett, L. R., laboratory electric furnaces, 412
Barrott, R. H., elected Associate, 221
Barrows, W. A., ceramic coatings, 288 ; ceramic high-temperature coatings, 288 ; porcelain enamelling, 288
Barry, J. J., hard facing, 406
Bartels, W., Dominican minerals, 73
Barthauer, G. L., Alice Haggerty, and **R. J. Friedrich,** analysis of synthesis gas, 414
Bartholomew, A., open-hearth checkers, 387
Bartu, F., open-hearth cooling, 169 ; tilting open-hearth burners, 169 ; venturi burners, 396
Basak, N. G. *See* Mukherjee, P.
Bashforth, G. R., open-hearth performance factors, 53 ; open-hearth repair and maintenance, 382
Bastien, P., ultrasonic testing, 87
Bastien, P., and **P. Amiot,** brittleness in H_2S, 195
Bastien, P., and **P. Azou,** hydrogen in tension deformation and rupture, 294
Bastien, P., A. Popoff, and **P. Azou,** deformations in tension, 183
Basu, T. N. *See* Lahiri, K. C.
Batch, A., elected Member, 220
Batcheller, H. G., steelmaking developments, 168
Bates, C. C., welding mild steel to cast iron, 406
Bates, L. F., and **D. H. Martin,** reverse-magnetization domains, 409
Batty, F A., elected Member, 220
Bauder, U. *See* Feldmann, H. D.
Baum, H., Manchukuo iron-ore and iron production data, 94 ; Turkish ore-production data, 93
Baumann, G., gas-cleaning disintegrators, 395
Baumeister, G. B., pipe inspection by ultrasonics, 293
Bawden, W. D., galvanizing furnace, 407
Baxter, C. F. *See* Rigbey, J. V.
Beatson, E. V., and **H. R. Brooker,** brazing, 283
Beaujard, L., G. Collette, and **L. Jacqué,** Fe–C–H system, 167
Beaujard, L., and **J. Jordeaux,** etching reagent, 295
Bechaüd, L. J., jun., taconite processing, 269
Becherer, G., and **H. Hülle,** X-ray studies of gas cylinders, 89
Beck, P. A. *See* Das, D. K.
Becker, M. L., austenite in ageing, 346 ; bainite transformation, 350
Bedford, G. T., stainless steels, 89
Beduneau, H., oxygen production, 198
Beech, A. S., sand treatment, 172
Beech, E. H., and **J. Hoyes,** core assembly, 174
Beeghly, H. F., determination of non-metallic compounds, 195 ; ferrous analysis, 299
Beerwald, A., stress corrosion, 91
Beilhack, M., cement sand, 172
Beisswänger, H., cupping test, 82
Bekleshova, G. E. *See* Butenko, G. A.
Belcher, R., determination of chlorine, 196
Belcher, R. L. *See* Calkins, G. D.
Bellchambers, H. E. *See* Ruff, H. R.
Belyaenko, I. P. *See* Varfolomeev, N. M.
Benad, H., roll profiles, 83
Bénard, J. *See* Bardolle, J.

Benesovsky, F., powder metallurgy, 84
Bennett, M. G., works traffic, 342
Bentke, H. *See* Mathesius, K.
Berg, H., elected Member, 220
Berg, S., cracks in bent tubes, 85
Bergenfelt, S., ore weathering, 73
Bergh, A. W. J. van den. *See* van den Bergh, A. W. J.
Bergson, M. A., friction cutting, 284
Berlek, J., Radex bricks, 394
Berman, R., thermal conductivities of refractory materials, 395
Berthold, R., non-destructive testing, 188 ; thickness measurement, 86
Bertin-Roulleau, manganese deposits, 268
Bertossa, R. C., vacuum brazing, 283
Bertren, V. de. *See* de Bertren, V.
Berwick, I. D. G., and **U. R. Evans**, chemical resistance of stainless steel, 299
Beu, K. E., X-ray measurement of austenite, 412
Beuken, L., J. de Boer, and **L. Smeets**, electric-furnace heat-storage determination, 274
Beuse, H., and **H. Koelzer**, magnetic-induction testing of bars, 188
Bhatnagar, S. S., and **B. R. Nijhawan**, abnormal structures in carburized steels, 278
Biel, H., metallization, 289
Biggs, W. D., machine-tool metals, 190, 295
Bilfinger, R., chromium plating, 286
Billigmann, J., *Book:* "Stauchen und Pressen," 94
Billingham, A., shearing in forging, 177
Billington, P. H., lighting, 198
Binns, A., load/strain recorders, 290
Binz, A. D., mill lubrication, 280
Bird, T. A., elected Member, 220
Bischoff, F., magnesite caustic burning, 394
Bish, G. R., and **H. O'Neill**, *Paper:* "The Deformation of Austenite in Relation to the Hardness Characteristics of Steel." *Discussion*, 347. *Authors' Reply*, 351
Bishop, C. A., air-pollution control in iron and steel works, 198
Bishop, F. W., electron-microscope stage, 190
Bishop, H. F. *See* Myskowski, E. T.
Bishop, J., pyrophyllite coatings, 407
Bishop, J. F. W., crystal deformation, 185
Bishop T., fabrication advances, 407 ; IRSID laboratories, 197 ; shaft induction hardening, 175
Black, A. J. D., ironfounding, 398
Blackburn, A., elected Member, 220
Blair, J. S., blast-furnace practice, 167
Blanc, G., metal research in U.S.A., 301
Blanchard, P., French steel foundries, 275
Blanderer, J., mechanical sampling, 300
Blank, E. M. *See* Barinov, N. A.
Blank, H. A., A. M. Hall, and **J. H. Jackson**, superheater-tube corrosion, 92
Blaser, R. U. *See* Kooistra, L. F.
Blatz, H., uranium-contaminated scrap, 170
Bleakney, H. H., ductility, 189
Blean, G. G., high-sulphur steels, 396
Blecher, G., moisture in coking, 75
Bligh, E. W., elected Member, 220
Block, E., G. Gad, and **B. Krüger**, titration of nickel, 196
Blokhin, M. A., X-ray spectrograph, 299
Blondel, A., gamma radiography, 87
Bloom, D. S., and **N. J. Grant**, sigma phase 296
Bloom, F. K., and **J. S. White**, Cr–Ni steel magnetic properties, 292
Blum, W., electroplated coatings, 285
Bockris, J. O'M., high-temperature research techniques, 270
Boedewadt, U. T., and **R. Engel**, combustion calculations. 74
Boer, J. de. *See* de Boer, J.
Boested, G., bearing lubrication, 281
Bogacheva, G. N., and **V. D. Sadovskii**, austenite stabilization, 193
Bogdanova, Z. S., *See* Yudenich, G. I.
Bögner, F., machinability, 284
Boiten, R. G., and **W. T. Cate**, strain gauge, 184
Bollinger, J., corrosion in SO_3, 195
Bolt, J. E., dephosphorization in cupola, 399
Bond, F. C, ore grinding, 74
Bondy, H. F., and **J. J. Priestley**, coke-plant waste-liquors control, 270
Bonem, F. L., aircraft corrosion protection, 299 ; enamelling refrigerators, 288
Bonnemay, M., H. Makram, and **J. Royon**, electroplate porosity, 286
Booth, E. H., elected Member, 220
Booth, S. F., specification symbols, 190
Borchert, H., ore-deposit sampling, 391
Borde, B. de. *See* de Borde, B.
Bornefeld, P. *See* Schulz, E. H.
Borsoff, V. N., D. L. Cook, and **J. W. Otvos**, gear wear, 86
Borysowski, Z. *See* Tomaszczyk, W.
Boston, O. W. *See* Datsko, J.
Both, E., powder cores, 290
Boucher, R. M. G., and **M. L. Franck**, Venturi gas washers, 270
Boulanger, C., solubility of C and N, 345
Boulby, J. C., elected Member, 220
Bounds, A. M. *See* Giacobbe, J. B.
Bourrat, J., G. Chaudron, and **I. Epelboin**, effect of oxygen on magnetic properties, 292
Bousmanne, L., elected Member, 220
Bouvier, H. de. *See* de Bouvier, H.
Bowen, A. N., elected Associate, 221
Bowen, H. N., rimming steels, 273
Bowers, C. N., W. J. McGuire, and **A. E. Wiehe**, stress corrosion of tubes, 91
Bowman, G., ingots for tubemaking, 397
Boyle, J. L., benzaldehyde from blast-furnace gas, 165
Boys, S. J. H., elected Member, 220
Braca, R. M., and **R. Merims**, high-temperature materials, 293
Brachet, C., radiography isotopes, 86
Bradfield, G., ultrasonics in solids, 410
Brading, T., and **G. Parks**, hydraulic servo-mechanisms, 179
Bradway, R. D., cracks in ship welding, 281
Braidwood, W. W., nodular iron, 400
Brampton, E. C., elected Member, 220
Brauns, E., pickling, 84
Bray, R. H. *See* Cheng, K. L.
Brayshaw, E. E., rolling rails, 280
Breckenridge, R. G., ionic-crystal relaxation, 192
Bremmer, F. H., and **F. J. Zehnder**, heat-treatment line, 403
Brenner, A., V. Zentner, and **C. W. Jennings**, electrodeposited nickel, 286
Breuil, J., steam-pipe lagging nomograms, 76
Bridge, A. *See* Elliot, G. D.
Bridges, E. H., elected Member, 220
Briggs, P. R. A. *See* Sims, R. B.
Brindley, G. W., and **R. F. Youell**, chamosite, 391
Brisby, M. D. J., and **R. W. Davis**, iron-ore wagons, 163
Brisby, M. D. J., and **R. T. Eddison**, *Paper:* "Train Arrivals, Handling Costs, and the Holding and Storage of Raw Materials." *Discussion*, 341. *Authors' Reply*, 343
Brissey, R. M., X-ray analysis, 300
Bristow, J. S., low-temperature steels, 88
British Electrical Development Association, *Book:* "Higher Industrial Productivity with Electricity," 94
British Iron and Steel Research Association, *Book:* "Physical Constants of Some Commercial Steels at Elevated Temperatures," 94 ; (Methods of Analysis Committee) *Paper:* "Determination of Copper in Iron and Steel," 335 ; (Methods of Analysis Committee) *Paper:* "Gravimetric Determination of Sulphur in Basic Steelmaking Slags," 28
British Welding Research Association, *Book:* "The Welding of Austenitic Corrosion- and Heat-Resisting Steels," 198
Brooks, C., elected Member, 220
Broadbent, R. *See* Donnelly, R. P.
Broberg, J., and **L. Villner**, moulding machines, 173
Bronowski, J., D. Fitzgerald, D. W. Gillings, and **D. C. Rhys-Jones**, coking-coal plasticity, 393
Brooke, M., corrosion inhibitors, 194
Brooker, H. R. *See* Beatson, E. V.
Brooks, S. H. *See* Voice, E. W.
Broom, T., deformation and resistivity, 187
Brosch, C. D., mould washes, 173
Brosheer, B. C., cold extrusion, 404
Brösse, W. *See* Lange, F.
Brouwer, A. A. *See* Ewing, D. T.
Brown, D. A., elected Associate, 221
Brown, G. B., large cold-tube mill, 280
Brown, H. S., slabbing-mill drive, 404
Brown, J., D. Clark, and **W. D. Clark**, *Letter:* "Stability of So-Called Delta-Ferrite Phase in Austenitic Steels," 316
Brown, L. S., recuperators, 67
Brüggemann, K., benzole washing, 75
Buch, H., elected Member, 220
Buchholtz, H., and **R. Pusch**, surface defects in hot-worked steel, 293
Buchholz, A., welding chain links, 406
Büchler-Hauschka, O., Radentheim magnesite works, 165
Buck, W. K., Ottawa magnetite, 391
Bücken, H. *See* Speith, K. G.
Buckle, H., chromizing, 286
Buckle, K. L., gas-turbine alloys, 88
Budinský, F., and **T. Světnička**, fatigue tests, 291
Buehl, R. C. *See* Royer, M. B.
Buehl, R. C., and **M. B. Royer**, spiegeleisen from open-hearth slag, 398
Bugmann, E., oil flash points, 83
Bühler, H., strain gauges, 409
Bühler, H., and **W. Schreiber**, stress determination by Heyn-Bauer method, 184 ; stress determination in hollow cylinders, 290 ; stress determination by Sachs method, 184
Bukin, V. V. *See* Presnyakov, A. A.
Bulakhova, P. A. *See* Usatenko, Iu. I.
Bull, J. R. A., elected Member, 220
Bullen, F. P., A. K. Head, and **W. A. Wood**, fatigue structures, 186
Bullough, W., elected Member, 220
Bumps, E. S., Charpy strain patterns, 290
Bungardt, K. *See* Scherer, R.
Bungeroth, A. *See* Speith, K. G.
Burdsall, R. L. *See* Schaefer, F. C.
Burgess, C. O., castings tolerances, 402
Burgess, E. L., beam rolling, 340
Burke, S. A., award of Ablett Prize, 220
Burke, S. A., and **G. A. Sparham**, gas-producer leveller bars, 165
Burke, T. H., blacking in moulding, 172
Burnett, G. E., and **C. B. Masin**, pipe-coatings testing, 84
Burnett, J. A. *See* Nash, H., jun.
Burns, G., radial cracking, 366
Burns, R., elected Member, 220
Burrill, E. A., high-voltage X-rays, 410
Burton, H., and **S. F. Suffolk**, thermocouples switching unit, 270
Burton, H. H., large forgings, 403
Bush, N. L., foundry clays, 171
Bushnell, R. S. *See* Dixon, M. C.
Busker, D., organic coatings, 288
Butenko, G. A., and **G. E. Bekleshova**, determination of Mn, Cr, and V, 92
Butterley, A. S., elected Member, 220
Byam-Grounds, J. S., elected Member, 220
Byrne, B. R., fatigue, 185

Cabarat, R., elasticity measurement, 87
Caffin, M., steel corrugation, 177
Caine, J. B., necked-down risers, 401
Caldwell, D. H., and **W. B. Lawrence**, water softening, 301
Caldwell, J. A., oil-well corrosion, 91
Calhoun, B. A. *See* Abrahams, S. C.
Calkins, G. D., and **R. L. Belcher**, radio-isotopes, 293
Callaghan, J., elected Associate, 221
Callenfels, G. W. Van S., open-hearth flames, 397

Calvo, F. A. C., elected Member, 220
Cametti, B. *See* Welch, W. P.
Camino, M. P., Haya, A. U., and **P. A. de Tejera,** forging manipulators, 81
Camolese, J. *See* Signora, M.
Camp, G. Van. *See* Van Camp, G.
Campbell, D. F., arc furnaces, 255
Campbell, D. K., and **L. J. Erck,** ore flotation, 269
Campbell, H. C. *See* Wentworth, R. P.
Cannon, J. H. *See* Clark, P. W.
Cantwell, J. B., castings impregnation, 277
Cape, G., and **L. Jehu,** distortion control in welding, 281
Caplan, D., and **M. Cohen,** scaling of Fe–Cr alloys, 299
Carberry, J. J., heat transfer, 164
Carlsson, O., and **S. Rydén,** clay sand binders, 172
Carr, A. L., temper brittleness, 361
Carr, H., tool steels, 89
Carr, W. J., jun., magnetization, 187
Carroll, J. B., copper brazing, 283
Carter, D. G., elected Associate, 221
Carter, P. T. *See* Morton, R. L.
Carter, P. T., A. B. Murad, and **R. Hay,** orthosilicate slags in FeO–MnO–SiO_2 system, 397
Carter, P. T., and S. Tahir, reaction between SO_2 and liquid iron in steelmaking, 273
Carter, R. D. *See* Preece, A.
Cartwright, W. F., electric furnaces, 253
Carvalho, A. T. de S., synthetic sands, 172
Carwile, N. L. *See* Geil, G. W.
Caswell, J. S., plant defects, 280
Cate, W. T. *See* Boiten, R. G.
Catelani, A., and **G. Somigli,** bentonites, 172
Cates, W. H., pipeline coatings, 407
Cavallaro, L., corrosion in liquid media, 91; corrosion research, 194
Cazaud, R., *Book:* "Fatigue of Metals," 302; *Book:* "Métallurgie," 95; fatigue-crack propagation and detection, 188; fatigue resistance, 85; fatigue-test study, 185
Černoch, S., blast-furnace belt charging, 77
Chakrabarti, N. G., Indian foundries, 174; Indian steel-foundry practice, 275
Chakrabarti, N. G., and **A. T. Vaswani,** shell moulding, 174
Chalmers, B., *Book:* "Progress in Metal Physics," 199; grain boundaries, 192
Chamberland, H. J., friction bandsaw, 277
Chamberlin, N. S. *See* Marks, H. C.
Chao, B. T., and **K. J. Trigger,** heat flow in machining, 406
Chapin, H. J. *See* Avery, H. S.
Charity, F., cast moulds and dies, 174
Charlesworth, K., elected Member, 220
Charley, R. M., arc-furnace transformers, 257
Charlton, J. R. *See* Thielsch, H.
Charlton, W. J. *See* Ridley, F. F.
Charnes, A., F. Osterle, and **E. Saibel,** fluid-film lubrication, 179
Charnes, A., and **E. Saibel,** Reynold's equation in lubrication, 179
Chase, H., automatic heat-treating, 278; barrel zinc plating, 287
Chatterjee, B. *See* Ghosh, P. C.
Chatterjee, G. P., hardness testing, 409
Chaudron, G. *See* Bourrat, J., *also* Collongues, R.
Chaussain, M., thermocouples, 76
Chaussin, C., isothermal treatments, 278
Chawner, P. M. H. *See* Ruffle, T. W.
Cheburkova, E. E., determination of Mg, 92
Chelyshev, N. A. *See* Sokolov, L. D.
Cheng, K. L., T. Kurtz, and **R. H. Bray,** limestone analysis, 300
Chesters, J. H., open-hearth flow patterns, 273; open-hearth refractories design, 273
Chida, A. *See* Isobe, M.
Child, H. C. *See* Harris, G. T.
Chipman, J., sulphur in iron and steel making, 169; *see also* Fulton, J. C.; Gokcen, N. A.; Shields, B. M.
Chippindale, T., elected Member, 220
Chow, J. G.–Y., and **D. W. Kaufmann,** ferritic chromium steel 293
Chudoba, K. F., recrystallization, 191
Chudzikiewicz, R., foundry fettling, 81
Chufarov, G. I. *See* Arkharov, V. I.
Chung, S. Y., and **H. W. Swift,** drawing cylindrical shells, 82; redrawing cylindrical shells, 178
Chuprinin, F. I. *See* Dudavskii, I. E.
Churchill, S. C., ferrous alloys, 295; investment castings, 411
Chyle, J. J. *See* Cota, A. F.
Cina, B., and **J. D. Lavender,** *Paper:* "The 475° C. Hardening Characteristics of Some High-Alloy Steels and Chromium Irons," 97
Claire, A. D. Le. *See* Le Claire, A. D.
Clarebough, L. M., M. E. Hargreaves, D. Michell, and **G. W. West,** energy measurement in deformation, 185
Clark, C. L., *Book:* "High-Temperature Alloys," 414
Clark, D. *See* Brown, J.
Clark, M. S., steelworks lubricants, 179
Clark, P. W., J. H. Cannon, and **J. White,** oxides sintering, 394
Clark, R. H., elected Member, 220
Clark, V. W. C., elected Member, 220
Clark, W. D. *See* Brown, J.
Clas, G., and **J. Schleissner,** cupola oxidation losses, 399
Clauser, H. R., welding and brazing, 283
Clem, A. G. *See* Sanders, C. A.
Clift, A., metallizing, 287
Clift, A., and **C. Knight,** *Paper:* "Heat Recovery in Industrial Furnaces." *Discussion,* 60
Close, G. C., hard chromium plating, 181
Coates, G. C., elected Member, 220
Coche, L., D. Dastillon, and **L. Wahl,** beneficiation of Lorraine ores, 74
Coche, M. L., beneficiation of Lorraine ores, 268
Cocks, C. J., hard chrome plating, 286
Cohen, M. *See* Caplan, D., *also* Paranjpe, V. G.
Colclough, T. P., open-hearth factors, 58
Cole, D. G. *See* Heal, H. T.
Colinese, P. E., pig-iron treatments, 170
Collaud, A., grey-iron toughness, 411; high-chromium tool steel, 411
Collette, G. *See* Beaujard, L.
Colley, T. W., elected Member, 220
Collins, B., electroplating, 181
Collins, R. D., Pitot tube, 175
Collongues, R., and **G. Chaudron,** oxide film, 194
Colombier, L., ultrasonic testing, 188
Comerford, F. M., soot from propane, 392
Comstock, G. F. *See* Freeman, J. W.
Concannon, W., elected Member, 220
Contractor, G. P., and **V. G. Paranjpe,** transformations correlation, 412
Cook, D. L. *See* Borsoff, V. N.
Cook, R., strip-gauge control, 353
Cook, R. W., elected Member, 220
Cooke, S. R. B., and **T. E. Ban,** ore pelletizing, 74
Coombes, G., biographical note, 71; *see also* Jones, W. R. D.
Cooper, M. D., manganese determination by periodate method, 413
Copson, H. R., corrosion cracking of pressure vessels, 413
Corbett, P. F., D. Flint, and **R. F. Littlejohn,** dew-point meter, 164
Corbett, P. F., and **R. F. Littlejohn,** sulphur oxides removal from gas, 165
Corbett, R., metal spraying, 289
Coriolis, E. G., and **J. D. Nesbitt,** forging furnaces, 277
Cornelius, H., aircraft steels, 89
Cornelius, J. R., electronic stress gauge, 290
Corral, F. M. del. *See* del Corral, F. M.
Corten, H. T. *See* Elsesser, T. M.
Corten, H. T., and **T. M. Elsesser,** stresses in loaded members, 85
Cosgrave, W. J. G., induction heating, 175
Cosslett, V. E., electron microscopy, 190
Cota, A. F., and **J. J. Chyle,** non-destructive tests, 293
Cottell, G. A., error sources in impact testing, 85
Cotton, P. L. *See* Porteous, J.
Cottrell, A. H., phases stability at grain boundaries, 346
Cottrell, A. H., and **G. M. Leak,** *Paper:* "Effect of Quench Ageing on Strain Ageing in Iron." *Discussion,* 344. *Authors' Reply,* 347
Cottrell, C. L. M., *Paper:* "Assessment of Weldability by Rapid Dilatation Tests," 17; delayed brittle fracture in welding, 282
Cottrell, S. A. *See* Ko, T.
Cottrell, S. A., and **T. Ko,** *Paper:* "Effects of High-Temperature Heating on the Isothermal Formation of Bainite." *Discussion,* 347. *Authors' Reply,* 351
Coulon, R. A., IRSID laboratories, 197
Coulton, F., elected Member, 220
Couronne. *See* Maillet
Courtheoux, J., rolling angles, 178
Cousans, F., and **W. C. Meredith,** manganese-steel castings, 80
Coutts, D. K. *See* Crawley, A. E.
Cox, G. J., elected Associate, 221
Cox, H. L., fatigue, 409
Crabtree, E. H., ore beneficiation, 392
Crafts, W. *See* Hilty, D. C.
Cramer, R. E., rail failures, 291; rail tests, 291
Crawford, A. E., ultrasonic generators, 410
Crawley, A. E., and **D. K. Coutts,** cast-iron pipes, 399
Cremer, E., burnt magnesite, 394
Cremer, E., and **F. Gatt,** magnesite thermal decomposition, 394
Crockard, F. H., ore evaluation, 391
Crook, A. W., work hardening, 186
Crookston, J. A., and **D. R. Torgeson,** firebrick testing, 271
Croxford, C., open-hearth charging, 78
Crussard, C., elected Member, 220; *see also* Aubertin, F.; Plateau, J.
Cubitt-Smith, G. *See* Zucker, M.
Cude, A. L., *Appendix:* "The Fuel Input Necessary to Maintain a Heat Loss in a Furnace," 52
Cundall, K. N., asphaltic coatings, 289
Curphey, J. S., *Paper:* "Some Factors Affecting Open-Hearth Steelplant Performance," 305; biographical note, 389
Curry, D. R., electroplate-thickness nomogram, 181
Curtiss, W. E., die lubricant, 177
Custer, J. D., and **J. S. McDowell,** foundry refractories, 395
Cuthbert, F. L., and **T. M. Dyer,** moisture in bentonite, 174
Czepek, R., electric-furnace elements, 278
Czerkasov, L. M. *See* Gudinovicz, W. S.

Daeves, K. *See* Heller, P. A.
Dale, D. R., rod-end heating, 175
Dale, J. D., powder metallurgy in armament making, 289
Dalziel, H. R., chromium steels, 294; chromium steels for mining, 411
Dammer, A., glass-industry steels, 189
Dancy, T. E., low-shaft blast-furnace, 166
Danilov, Iu. S. *See* Ratner, S. I.
Dannöhl, W., magnet materials, 187
Darken, L. S., Fe–C–Si system, 249
Darken, L. S., and **R. W. Gurry,** *Book:* "Physical Chemistry of Metals," 414
Darling, C. S., fuel saving, 393
Därmann, H. J. *See* Mayer, K., *also* Oelsen, W.
Das, D. K., S. P. Rideout, and **P. A. Beck,** Mo-alloy phases, 297
Das, M., elected Member, 220
das Gupta, A. K., K. Y. Shrikhande, and **A. Lahiri,** fluidized coal beds, 269
Dasgupta, D. R., and **J. C. Maitra,** limonite X-ray study, 73
da Silva, L. C. C., diffusion, 86
Dastillon, D. *See* Coche, L.
Datsko, J., and **O. W. Boston,** grey-iron machinability, 406
Daurat, J., rare-earth additions for hot working, 294
Dautrebande, L., dusts, 301

Davidenkov, N. N., I. S. Zhakovskaya, and **V. A. Zhuravlev,** elasticity modulus in torsion, 182
Davidson, G. H., electric distribution, 263
Davies, C. N., dust separation, 198
Davies, H. C., elected Member, 220
Davies, H. V., elected Member, 220
Davies, O. C., elected Member, 220
Davies, P. M., elected Associate, 221
Davies, R., elected Member, 220
Davis, E. T., fire-fighting equipment, 198
Davis, G. L., and **O. F. Tuttle,** $CaO \cdot Al_2O_3 \cdot 2SiO_2$ phases, 394
Davis, H. M. *See* Keeler, J. H.
Davis, J. B., W. Ernest, and **H. Kay** *Paper:* "Trials of an Experimental Austeel-Escher Metallic Recuperator." *Discussion,* 60
Davis, R. W. *See* Brisby, M. D. J.
Davis, V. C. *See* Pennington, J.
Davis, W. N., foundry safety, 277
Davison, D. W., magnetic alloys, 187
Davison, L. M., molybdenum disulphide as lubricant, 405
Davison, T., elected Member, 220
Dawihl, W., powder-metal contraction, 182
De Araujo, J. B., charcoal-furnace effects on Brazilian forest reserves, 197
de Araujo, L. A., oxygen lancing, 78
Debenham, W. S. *See* Eusner, G. R.
de Bertren, V., dusteatchers, 301
de Boer, J. *See* Beuken, L.
de Borde, B., alloy steels, 295
de Bouvier, H. *See* Grandpierre, M.
Decrop, M., core baking, 401 ; propane in foundry, 81
DeFord, D. D. *See* Pitts, J. N., jun.
Degley, M. F., sand-storage silos, 275
Dehaine, M., crankshaft production, 278
Dehne, W., blast-furnace tuyere design, 271
Dekanovsky, A., active mixers, 78
Delahay, P., C. F. Pillon, jun., and **D. Perry,** temperature effect on oxygen consumption, 194
de la Paz, J. A. G., Rif ore, 268
del Corral, F. M., α-phase in Fe–C system, 297 ; boron steels, 294 ; iron oxides reduction by carbon, 272
de Leiris, H., castings fatigue failure, 291 ; sweating crack-detection test, 87
de Leon, J. A. y., development of scientific thought, 300
Delport, V., French foundry-research centre, 402 ; roll foundry, 402
del Real, L. B. *See* Martinez, M. S.
Demarez, A. *See* Meunier, F.
de Martinville, J. S., tool steels, 189
Demer, L. J. *See* Lazan, B. J.
Denison, I. A., and **M. Romanoff,** corrosion of buried galvanized steels, 297 ; corrosion of buried iron and steels, 298
Dennis, W. E., *Paper:* "Heterogeneous Nucleation of Graphite in Hypo-Eutectoid Steels. *Correspondence,* 31. *Author's Reply,* 31
d'Entremont, H., cast irons 295
Denzler, R. E., blowers and fans, 76
De Paiva, G., Brazil-ore export, 197
Depew, B. W., heating costs, 175
Desfossez, P., elected Member, 220
de Smet, G., *Book:* "La Pratique des Traitements Thermiques des Métaux Industriels," 303
de Sousa, A., reagent for Mn, 93
De Sy, A., nodular iron, 275
de Sy, A.-L., nodular iron, 79
de Tejera, P. A. *See* Camino, M. P.
Dettner, H. W., cyanide zinc baths, 286
DeVaney, F. D., ore roasting, 268
Devilder, P., liquid-steel temperature measurement, 270
Dexter, D. L., conductivity and cold work, 293
Diarte, C. D., industrial ultrasonics, 293
Dickinson, T. A., stretch forming, 279 ; U.S. west-coast steelworks, 272
Dickson, R. W., rail mill, 404
Didier, H. *See* Ritter, E.
Dierichs, A., oils polarity, 280
Dijkstra, L. J., and **R. J. Sladek,** nitrogen behaviour in α-iron, 294
Dixon, M. C., and **R. S. Bushnell,** shell moulding, 401
Dmitrieva, A. M. *See* Pen'lova, E. F.
Dobie, W. S., elected Member, 220
Dobransky, R., African ores, 73 ; Greek ore production data, 93 ; Hungarian ore and iron production data, 93 ; Yugoslavian ore and metal production data, 93
Dobrý, J., blast-furnace carbon linings, 76 ; low-temperature tests on Czech steels, 88
Dodd, J. *See* Riley, R. V.
Dodge, B. F., oxygen, 198
Donahue, J. F., *See* Arthur P.
Donald, A. J. *See* Hadfield, D.
Donnelly, R. P., R. Broadbent, and **B. J. O'Leary,** coal reactivity, 165
Doss, J. *See* Eisler, S. L.
Dostal, B., gas cleaning, 165
Doumenc, J. *See* Faraggi, H.
Dovey, D. M., and **K. C. Randle,** carbonitriding, 278
Dowding, M. F., strip-gauge control, 354
Dragan, W. *See* Kuczewski, W.
Draycott, H. H., elected Member, 220
Drechsler, M., and **E. W. Müller,** field electron microscope, 90
Dressler, A., effect of copper on railway-steels corrosion, 298
Dryden, I. G. C., coal density, 393
Dublo, A. J., cupola practice, 274
Duckworth, D. M. *See* Kinner, G.
Ducrocq, A., electronic metering, 184
Dudavskii, I. E., and **F. I. Chuprinin,** X-ray tube, 90
Dudley, J. J., elected Associate, 221
Dufiot, J., supersaturation of Fe with cathodic H, 88 ; *see also* Plateau, J.
Duke, R., elected Member, 220
Duley, D. W., all-basic open-hearth, 170
Dulis, E. J. *See* Smith, G. V.
Dulis, E. J., and **G. V. Smith,** nitrogen formation in creep-rupture, 297
Dummett, G. A., benzole refining, 270
Dummett, W. M., core binders, 174
Dunham, K. C., fluorspar in Britain, 163
Dunn, C. G. *See* Fisher, J. C.
Dunsmuir, P., polycrystal goniometry, 90
Durelli, A. J., and **S. Okubo,** brittle-coating sensitivity, 408
Dwyer, P., pulley casting, 174
Dyer, T. M. *See* Cuthbert, F. L.
d'Yerville, J., rolling mills, 178
Dymov, A. M., and **S. S. Gorelik,** separation of iron niobide, 90

Eagan, T. E., nodular-iron properties, 411
Earley, C. C., and **J. F. Nankivell,** *Appendix:* "Electron Microscope Study of the Microstructural Changes during Ageing," 120
Eckart, O., bentonite as binder, 80
Eddison, R. T. *See* Brisby, M. D. J.
Edeleanu, C., *Paper:* "Transgranular Stress Corrosion in Chromium–Nickel Stainless Steels." *Correspondence,* 218. *Author's Reply,* 218
Edge, A. E., coking plant, 393
Edmondson, B., elected Associate, 221
Edwards, A. H. *See* Tomlinson, R. C.
Edwards, J., electric furnace, 398
Edwards, R., work of Sorby, 93
Egerer, Hanisch, Hildebrandt, and **Kratzenstein,** three-dimensional X-rays, 90
Egerton, G. S., spectrophotometry, 195
Eichborn, J. L. von. *See* von Eichborn, J. L.
Eichel, K., *Book:* "Das basische Windfrischverfahren," 302
Eicke, H. *See* Schulze, A.
Eilender, W., tinplate passivation, 195
Eilender, W., and **J. Schoop,** converter linings, 76
Eisenkolb, E., powder metallurgy, 182
Eisenkolb, F., iron powders, 84
Eisler, S. L., and **J. Doss.** phosphating rinses, 288
Ekhaus, S., I. Wolock, and **B. L. Harris,** paint-films porosity, 289
Ellingham, H. J. T., electrolysis, 181
Elliot, G. D., A. Bridge, E. Jarvis, and **T. E. Mitchell,** *Paper:* "Relining and Enlarging No. 9 Blast-Furnace at Appleby-Frodingham," 143
Elliott, R., elected Member, 220
Ellis, E. B., ultrasonic testing, 87
Elmer, T. H., silicon carbide resistors, 395
Elphick, J. O., and **T. Gerson,** sulphur determination in coal, 196
Elsesser, T. M. *See* Corten, H. T.
Elsesser, T. M., O. M. Sidebottom, and **H. T. Corten,** ageing and Bauschinger effect in beams, 85
Elson, A., and **P. Wright,** accident prevention in iron and steel works, 198
Elvidge, W. F., analysis, 92
Emerson, R. W., Cr–Mo pipe steels, 88
Emigh, C. R., and **L. R. Megill,** energy distribution in X-rays, 293
Emmerson, L. G., elected Associate, 221
Emmerson, T., elected Member, 220
Ende, H. vom. *See* vom Ende, H.
Engel, R. *See* Boedewadt, U. T.
Engelhardt, W., yielding, 183
Englisch, C., piston-ring casting, 276
Enke, H., crane controls, 405
Entremont, H. de. *See* d'Entremont, H.
Entwisle, A. R. *See* Austin, G. W.
Epelboin, I., electrotinning, 286 ; *see also* Bourrat, J.
Epifanov, G. I. *See* Pleteneva, N. A.
Epifanov, G. I., and **L. A. Schreiner,** surface-active liquids in machining, 283
Erck, L. J. *See* Campbell, D. K.
Erdmann, R., vapour-phase coatings, 84
Ergun, S., pressure drop in shaft furnaces, 272
Erickson, H. W., crushing, 391
Ernest, W., electric furnaces, 258 ; *see also* Davis, J. B.
Ernst, H., crane design, 405
Eschbacher, E. W. *See* Puzak, P. P.
Escher, H., *Paper:* "Experiences with the Escher Metallic Recuperator on High-Temperature Furnaces." *Discussion,* 60. *Correspondence,* 68. *Author's Reply,* 69
Etze, H. W., recording spectrophotometer, 413
Euler, H., job evaluation, 197
Eusner, G. R., and **W. S. Debenham,** brick spalling, 394
Evans, E. C., sulphur in iron and steel making, 77
Evans, F., tinplate history, 93
Evans, J. L., elected Associate, 221
Evans, Ll., and **H. A. Sloman,** *Paper:* "Studies in the Deoxidation of Iron. Deoxidation by Titanium," 319
Evans, L. R., elected Member, 220
Evans, N. L., descaling stainless tubes, 406; investment castings, 173
Evans, R. W., and **I. S. Scott-Maxwell,** *Paper:* "Repair and Maintenance of Open-Hearth Furnaces in U.S.A.," 378. *Discussion,* 382.
Evans, U. R. *See* Berwick, I. D. G.
Evans, V., plastics, 289
Evans, W. M., explosive fracture, 85
Everest, A. B., foundry practice, 170
Everhart, J. L., carburizing, 175 ; nitriding, 81 ; Ti-boron steels, 189
Evrard, M. *See* Gerbeaux, H.
Ewing, D. T., A. A. Brouwer, and **J. K. Werner,** iron in nickel-plating baths, 407
Eymann, C. *See* Barking, H.
Eyre, J. W., elected Associate, 221
Ezran, M., wear study by radio-isotopes, 280

Fagg, D. N., and **N. B. Rutherford,** zinc saving in galvanizing, 286
Fairfield, H. H., and **J. McConachie,** sand flowability and castings finish, 400
Fairfield, H. H., J. McConachie, and **H. F. Graham,** moulding-sand reclamation, 80
Fairholme, I. W. F., elected Member, 220
Falk, M., gamma radiography, 188
Fal'kova, O. B. *See* Mandel'shtam, S. L.

Fallows, J., shell moulding, 173
Fancutt, F., and J. C. Hudson, protective coatings, 193
Fangemann, M. G., precision springs, 89
Farafonow, W., fuel analysis, 196
Faraggi, H., A. Kohn, and **J. Doumenc,** boron autoradiography, 300
Farber, M., and **D. Ehrenberg,** high-temperature corrosion in H_2SO_4 and SO_2, 195
Farmer, M. H., and **G. H. Glaysher,** electro-turning tensile specimens, 183
Farrer, T. W., and **F. Wormwell,** corrosion in sulphur suspensions, 298
Fast, J. D., strain ageing, 409
Fast, J. D., and **E. M. H. Lips,** metal research in Holland, 301
Faure, B., pattern plates, 401
Fayles, R. R., rammed and castable refractories, 271
Fechner, H. *See* Meurer, O.
Feige, W., and **A. Neuhaus,** pot annealing furnaces, 176
Feijo, A. H. da S., ore beneficiation, 74
Feldmann, H. D., cold-pressing forces, 177
Feldmann, H. D., and **U. Bauder,** drawing hollow bodies, 82
Feldmann, W. *See* Schaffer, O.
Felipe, L. R., nitriding, 278
Felix, W., ultrasonic testing, 410
Feng, I.-M., metal wear, 187
Fenner, A. J. *See* Phillips, C. E.
Fern, K. A., cyclone dressing, 163
Ferro, A., steel casting, 174
Ferry, M., basic cupola, 79
Fert, C., and **R. Saporte,** electron microscopy, 190
Field, M., and **N. Zlatin,** machinability evaluation, 83
Field, M., N. Zlatin, and **J. F. Kahles,** structure and machinability, 89
Figueras, J. de F. y. *See* Martinez, M. S.
Filimonov, L. N. *See* Veselovskaya, I. M.
Findley, W. N., P. G. Jones, W. I. Mitchell, and **R. L. Sutherland,** fatigue machines, 185
Fine, M. E., elasticity determination, 408
Fink, K., elongation measurement, 184
Fink, K., and **Ch. Rohrbach,** strain gauges, 409
Finkelnburg, H., jet lapping, 84
Finlayson, J. F. *See* Hollebon, A. B.
Fischer, H., open-cast mining, 73
Fischer, O., surface hardening, 81
Fischer, W. A., and **H. vom Ende,** phosphorus distribution, 78
Fisher, J. C., and **C. G. Dunn,** tensions of single-phase solids, 192
Fisher, R. J., elected Associate, 221
Fitzer, E., surface enrichment by tungsten or molybdenum, 175, 176
Fitzgerald, D. *See* Bronowski, J.
Flamm, A. *See* Winter, H.
Flanigan, A. E., and **T. Micleu,** weld embrittlement, 405
Flehmig, S., coal-preparation costs, 75, 165
Fleischmann, M., hot-cold work, 293
Fletcher, H. O., elected Associate, 221
Fletcher, S. G., die steels, 175
Fletcher, S. G., and **D. Hughes,** carbide segregation in tool steels, 191
Flint, D. *See* Corbett, P. F.
Floersch, B. G., rubber-base coatings, 289
Flotats, J. F., non-metallic inclusions, 274
Flux, J. H., arc furnaces, 255
Foex, M., Al_2O_3/V_2O_3 refractories, 166
Fontana, M. G., corrosion, 194, 413
Fonteyn, M., protective painting, 182
Ford, D. D. De. *See* DeFord, D. D.
Ford, H. *See* Watts, A. B.
Forrest, P. G., fatigue-machine weighbar, 186
Forrester, P. G., and **A. A. Milne,** boundary friction, 405
Förster, F., electronic tests, 87
Forster, G. G., elected Associate, 221
Förster, M., steelmaking rationalization, 77
Förster, W., shear blades, 89
Forsyth, P. J. E., hot-stage microscope, 295
Fotiadi, A., fatigue and deformation, 186
Fowler, C. A., jun., and **E. M. Fryer,** magnetic domains on silicon iron, 296
Fowler, R. M. *See* Hammer, H. L.
Fox, J. E., pressings handling, 82
Franck, M. L. *See* Boucher, R. M. G.
Franck, R. J., steel casting, 80
Frankau, A. M., *Paper:* "The Water-Cooling of Open-Hearth Furnaces," 46
Franke, E., corrosion-resistant structures, 195; gas-turbine steels, 189
Franssen, H., microhardness, 186
Fraser, J. P., and **R. S. Treseder,** cracking in H_2S, 91
Frede, L., core buoyancy, 275
Fredholm, L. *See* Wahlberg, T.
Fredov, V. N., and **A. I. Zajceva,** ball-working of press tools, 279
Freeman, J. M. *See* Rose, B.
Freeman, J. W., G. F. Comstock, and **A. E. White,** creep and rupture of Ti-stabilized stainless, 88
Frei, E., fuel sampling, 393
French, W., light-section mill, 280
Frenkel, C., elected Member, 220
Freudenthal, A. M., and **E. J. Gumbel,** fatigue-test statistical interpretation, 185
Freyberger, W. L. *See* Gaudin, A. M.
Frick, F. F., sponge-iron practice, 272
Friedrich, R. J. *See* Barthauer, G. L.
Frisbie, W. J., jun., open-hearth practice, 169
Frischmann, T. A., heat-treatment equipment maintenance, 278
Frocht, M. M. *See* Leven, M. M.
Fry, E., foundry supervision, 402
Fry, H. L., impact tests, 408
Frye, J. H., jun., E. E. Stansbury, and **D. L. McElroy,** pearlite growth rate, 297
Fryer, E. M. *See* Fowler, C. A., jun.
Fuller, T. S., electric-industry steels, 189
Fulton, J. C., N. J. Grant, and **J. Chipman,** silicon reduction by blast-furnace-type slags, 272
Fundator, V. I., sand-permeability apparatus, 80
Funke, P. E. *See* Guthmann, K.
Furmidge, J. E., elected Associate, 221

Gabler, F., surface testing, 283
Gad, G. *See* Block E.
Gagnaire, L., combustion of gases, 392
Gailer, R., elected Member, 220
Gaiser, E. *See* Lupfert, H.
Galletto, C., nodular iron in U.S.A., 79
Galloway, C. D., cement sand, 172
Gamsachhurdia, T. R., and **K. S. Kutateladze,** iron compounds in foundry sands, 172
Gardam, G. E., electrodeposition, 181
Gardiner, A. G., cupola practice, 170
Gardner, L. E., elected Member, 220
Garf, M. E., testing machines, 85
Garland, C. W. *See* Jura, G.
Garofalo, F., P. R. Malenock, and **G. V. Smith,** effect of temperature on steel elasticity, 408
Garrido, E. Y. *See* Ortueta, R. de L.
Gascuel, L., flame-reversal arrangements, 273; sharp-angled rolls, 178
Gaskell, J. L., electric distribution, 261
Gatt, F. *See* Cremer, E.
Gattringer, R. *See* Kroneis, M.
Gaudin, A. M., mineral dressing by radioactivity, 268
Gaudin, A. M., F. E. Senftle, and **W. L. Freyberger,** mineral separation by radio-activity, 268
Gazard, J. S., and **G. E. Jones,** tinning at Trostre, 287
Geiger, T., effect of polishing on hardness, 186
Geil, G. W., and **N. L. Carwile,** low-temperature deformation twinning, 296; strain-temperature effects in ingot iron, 185
Generozov, B. A., slag-basicity determination, 78
Gensamer, M., fatigue, 291
Georgen, F. A. *See* Steinberg, W.
Gerbeaux, H., and **M. Evrard,** gamma radiography, 87
Gerdet, A., hot lead coating, 287
Gerhardt, O., protective coatings, 194; rust morphology, 194
Gericke, S., P_2O_5 solubility in converter slags, 168
Gerson, T. *See* Elphick, J. O.
Gertsman, S. L., boron as substitute, 189; steel temperature and grain-size, 400
Gesell, W., shot-blasting, 284
Gessner, F., thermit welding of rails, 406
Ghosh, P. C., and **B. Chatterjee,** hydrogen in white iron, 400
Giacobbe, J. B., and **A. M. Bounds,** Bourdon-tube materials, 89
Giberti, E., reheating-furnace test, 175
Gierdziejewski, K., casting defects, 81
Gieseler, K., coal swelling, 75
Gilchrist, J. D. *See* Taylor, J.
Gilg, F. X., boiler design, 393
Gillam, E. *See* Heal, H. T.
Gillam, E., and **H. T. Heal,** X-ray fluorescent analysis, 92
Gilles, J. W., blast-furnace history, 197
Gillings, D. W. *See* Bronowski, J.
Gilman, J. J., martensite formation after prequench, 412
Gindin, L. G., corrosion immunizers, 296
Ginguené, J. *See* Guingand, J.
Girardi, D. J. *See* Michalos, G. P.
Gladfelter, W. I., airless-blast tumbling, 284; monorail conveyor in cleaning, 401
Glass, H. M., refractory specifications, 394
Glass, P., Askania cupola-blast control, 170
Glaysher, G. H. *See* Farmer, M. H.
Gledhill, F. G., elected Member, 220
Gledhill, P. K. *See* Voice, E. W.
Glen, J. E., elected Associate, 221
Glikman, L. A., and **V. P. Tekht,** fatigue, 291
Glocker, R., and **E. Macherauch,** bending yield point, 183
Glover, S. G., elected Associate, 221
Gobus, A., hot-weld radiography, 283
Godfrey, H. J., elongation tests on wire, 295
Godiniaux, R., sinter plants, 164
Godsave, G. A. E., combustion of solid-fuel particles, 164; heat transfer, 392
Goebbels, H., magnetic testing, 188
Gohn, G. R., fatigue machine, 185
Gokcen, N. A., gas/metal equilibrium, 273
Gokcen, N. A., and **J. Chipman,** Al/O equilibrium in liquid iron, 273
Goldberg, C., stereography of cubic crystals, 90
Goldfein, H., blast-furnace water failures, 395
Goldschmidt, E. *See* King, C. V.
Golownew, I. F., and **M. A. Golownewa,** forging and casting comparisons, 81
Golownewa, M. A. *See* Golownew, I. F.
Golumbic, C. *See* Orehin, M.
Gomberg, M. L., and **S. V. Leushchenko,** testing permanent magnets, 292
Goodall, J. M., electric distribution, 262
Goodbar, J. A., Carlite in die stamping, 403
Goodchild, K. T., elected Associate, 221
Goodeve, (Sir) Charles, steel in the electrical industry, 191
Goodwin, R. D., CO_2 recorder, 414
Goosens, H. C., and **C. Vollers,** weldability tests, 282
Gorczynski, J. *See* Jankowski, A.
Gordet, A., nail galvanizing, 407
Gordon, S. H., cable conveyors, 163
Gorelik, S. S. *See* Dymov, A. M.
Gotô, H., and **Y. Kakita,** determination of lime in slag, 415
Gottfeld, F., radiography isotopes, 86
Götzlinger, J., crane stresses, 83
Gould, R. K., machinability, 284
Gouzou, J., *See* Homès, G. A.
Goyns, H. J. G., large arc furnace, 397
Graham, A., rheology, 412
Graham, H. F. *See* Fairfield, H. H.
Grand, R. Le. *See* LeGrand, R.

Grandpierre, M., and **H. de Bouvier,** effect of phosphorus on nodular graphite, 171
Grant, J. W., graphitization of martensite, 79
Grant, N. J., high-temperature fatigue, 291; *see also* Bloom, D. S.; Fulton, J. C.; Shields, B. M.
Gras, W., coke-distillation gases, 75
Gray, A. G., barrel finishing, 180; low-nickel stainless steel, 411; protective coatings, 288; specification codes for metals, 295; waste-liquor recovery by ion exchange, 285
Gray, A. N., copper-clad wire, 407
Greenaway, H. T., S. T. M. Johnstone, and **M. K. McQuillan,** high-temperature analysis by W/Mo couple, 297
Greenhouse, H. M., oxidation of carbide cermets, 289
Greenwood, H. D., coking industry, 269
Greenwood, H. W., iron powder metallurgy, 289; powder metallurgy, 182, 407
Gries, H., casting nodular iron, 399
Gries, H., and **W. Trommer,** synthetic sands, 172
Griese, F. W., welded structures, 405
Griffiths, A. H., bar mill, 178
Griffiths, H. W., casting, 172
Griffiths, W. H., coal preparation, 393
Grimshaw, L. C., tool-steel control, 273
Grimshaw, R. W., and **A. L. Roberts,** thermal analysis of clay minerals, 414
Gröbner, W., and **A. van Ahlen,** coke-oven wall temperatures, 75
Grochalski, R., foundry sands, 172; lignite ash in moulding, 172
Grodzinski, P., abrasion test, 186; electric machining, 283; hardness testing, 186; micro-wear tester, 409
Groome, J., degreasing, 84
Groothoff, A., iron and steel industry in South America, 197
Gross, G. *See* Hubert, M.
Grossman, M. A., obituary notice, 159
Groth, W. G., and **R. E. Maersch,** Al–bronze filler metal, 283
Grounds, A., coal cleaning, 74
Grover, A. E., foundry costing, 276
Groves, A. W., British ore resources, 73
Groycki, J. *See* Markuszewicz, M.
Grubitsch, H., and **H. Väyrynen,** iron solution in HCl, 194
Gruca, E. *See* Karnisky, B.
Grunberg, R., die-casting moulds, 402
Grungo, G. *See* Ziliani, G.
Grünther, H., synthetic-sand moulds, 275
Gude, W. G., automatic moulding, 401
Gudgeon, W., foundry reminiscences, 81
Gudinovicz, W. S., and **L. M. Czerkasov,** wear-resisting cast iron, 292
Guedras, M., ingot moulds, 274; moulding-sand dust, 275
Guérin, H., and **L. Hosti,** coke reactivities, 165
Guingand, J., and **J. Ginguené,** pickling, 285
Guinier, A., crystals substructures, 192; stress measurement by X-rays, 290; X-ray diffraction testing, 87
Gulbransen, E. A., and **K. F. Andrews,** chromium oxidation and vapour pressure, 195
Gumbel, E. J. *See* Freudenthal, A. M.
Gunn, D. C., combustion-loss measurements, 164
Gupta, A. K. das. *See* das Gupta, A. K.
Gurry, R. W. *See* Darken, L. S.
Guruswamy, S., coal shatter, 165
Guthmann, K., blast-furnace-gas cleaning, 271; pyrometry, 393
Guthmann, K., P. E. Funke, W. Hunsinger, C. Kreutser, W. Keller, O. Stebel, and **W. Wislicenus,** furnace roof temperature measurement, 76
Guttman, L. *See* Smith, C. S.
Gysen, F., powder cutting, 283

Haarmann, R., zinc galvanizing residues, 287
Hadfield, D., and **A. J. Donald,** teeming temperature, 273
Hagedorn, H. *See* Piper, E.
Haggerty, Alice. *See* Barthauer, G. L.
Haglund, G. O., strain-gauge accelerometers, 290
Hájiček, O., blast changes in blast-furnace practice, 395
Halbach, C. von Bohlen und, and **W. Leitgebel,** effect of O in Fe–Ni and Cu–Ni, 90
Hall, A. M. *See* Blank, H. A.
Hall, D. A. *See* Tomlinson, R. C.
Hall, J. R. *See* Nash, H., jun.
Hall, N., metal finishing, 285
Hall, W., elected Member, 220
Hallam, R., recuperation, 68
Haller, C. T., ductile iron, 89
Haller, M., turbo-blowers, 166, 168
Halls, E. E., barrier cream, 181
Halm, L., insulating refractories, 271
Halsbury (Lord), National Research Development Corporation, 198
Hamilton, J. *See* Symington, R.
Hammer, J., dolomite quarrying, 394
Hammond, J., elected Member, 220
Hammond, R., machine foundations, 279
Hamner, H. L., and **R. M. Fowler,** determination of O in presence of S, 413
Hancock, P. F., annealing whiteheart malleable, 79
Hanemann, H., plunger for hardness tests, 409
Hanisch. *See* Egerer
Hann, K. G., elected Member, 220
Hanson, D., obituary notice, 389
Hanson, T. A., gas-holder purging, 270
Hanson, V. D., W. K. Heinlein, and **J. M. Vonfeld,** coal separation, 74
Harby, A. J., works traffic, 341; elected Member, 220
Hardy, V. H., determination of Al and Fe in Zn, 196
Hargreaves, A. L., elected Member, 220
Hargreaves, F., filiform corrosion, 194
Hargreaves, M. E. *See* Clarebough, L. M.
Harley, T. H., zebra roofs, 78
Harms, F., electric-furnace linings, 397; steel casting, 400
Harris, B. L. *See* Ekhaus, S.
Harris, D. E., metal spraying, 289
Harris, G. B., obituary notice, 266
Harris, G. B., and **W. Hume-Rothery,** *Paper:* "The Liquidus ⇌ Solidus Relations in the System Iron–Cobalt in the Range 0–30 Atomic % Cobalt," 212
Harris, G. T., and **H. C. Child,** *Paper:* "Effect of Composition on the Warm-Working Characteristics of Austenitic Alloys," 325
Harris, W. R., mill regulating systems, 178, 404
Harrison, J. M., Labrador ore fields, 268
Hartford, W. H., chrome-ore analysis, 414
Hartley, H., gas cookers, 181
Harvey, R. F., martempering, 403
Harvey, V. H., elected Member, 220
Hashimoto, Y. *See* Homma, M.
Haudricourt, A. G., cast iron in China, 93
Hauffe, K., oxidation, 194
Hauffe, K., and **H. Pfeiffer,** wüstite-formation kinetics, 195
Hauk, V., grey-iron deformation study, 185
Havlik, F., rotary cold forging, 279
Hawke, W. D., elected Member, 220
Hawkins, T. H., elected Member, 221
Hawkridge, L. D., obituary notice, 159
Haworth, A. R., gamma radiography, 87
Hawthorne, W. R., fuel thermodynamics, 392
Hay, R., development of Scottish iron and steel industry, 301; *see also* Carter, P. T.
Haya, A. U. *See* Camino, M. P.
Hayama, F., wear of nodular iron, 409
Hayashi, I. *See* Yamanouchi, H.
Haynes, H. W., core ramming, 400
Hayter, C. H., elected Member, 221
Hazel, J. F. *See* Reiss, W.
Hazel, J. J., blast-furnace carbon hearths, 76
Head, A. K., dislocations, 296; *see also* Bullen, F. P.
Heal, H. T. *See* Gillam, E.
Heal, H. T., E. Gillam, and **D. G. Cole,** high-temperature camera, 190
Heger, J. J., stainless steels, 278
Heidenreich, R. D., electron microscopy, 191
Heinlein, W. K. *See* Hanson, V. D.
Heinrichs, W., basic-cupola linings, 274
Heisler, J. Y., lime baths in wire drawing, 279
Heller, P. A., foundry literature review, 170, 274
Heller, P. A., and **K. Daeves,** piston-ring structural indices, 89
Hempel, M., fatigue testing, 85, 291; *see also* Sander, H.-R.
Henderson, H. E., and **P. M. Hulme,** calcium carbide injection into liquid iron, 399
Henderson, M. I., elected Member, 221
Hendrick, H., and **G. Schiebe,** magnetic separation of iron ores, 163
Hendricks, R. P., fettling castings, 277
Henny, V. E., flame-temperature chamber 393
Henshelwood, J. E., raw materials at Port Kembla, 269
Hensley, J. W., cleaning study by radio-isotopes, 285
Herbert, D. C., and **E. A. Jenkinson,** creep of superheater tubes, 87
Herbiet, H. *See* Langers, R.
Herbine, S. C., foundry safety, 277
Herington, C. E., Meehanite irons, 190
Hermida, S. V., coercive field, 187
Herold, R., shell-mould assembly, 401; shell moulding, 173
Herring, C. *See* Bardeen, J.
Herzog, E., stress-corrosion cracking of mild steels in nitrate solution, 140, 317; elected Member, 221
Hessenberg, W. C. F., and **R. B. Sims,** sheet and strip gauge control, 83
Heuschkel, J., spot welds, 282
Heuss, T. *See* Steinberg, W.
Heuvers, A., work of Jacob Meyer, 301
Heyman, J. *See* Roderick, J. W.
Hilbert, H. L., deep drawing, 279
Hildebrandt. *See* Egerer
Hiller, H., pressure-casting dies, 276
Hilliard, J. E., and **W. S. Owen,** *Paper:* "A Thermal and Microscopic Study of the Iron–Carbon–Silicon System." *Correspondence,* 249. *Authors' Reply,* 250
Hills, R. F., elected Member, 221
Hilterhaus, K. *See* Lanzendörfer, E.
Hilton, H. G., open-hearth repair and maintenance, 383
Hilty, D. C., and **W. Crafts,** Fe–S–O liquidus, 412
Hinnüber, J., and **O. Rüdiger,** surface activity of powdered metals, 182
Hipperson, A. J., welding in maintenance, 281
Hirata, M. *See* Monma, K.
Hirone, T., and **N. Kunitomi,** internal friction of ferromagnetic, 86
Hirst, A. A., gig washers, 165
Hislop, J. D., non-destructive testing, 410
Hitt, W. C., ultrasonic testing of immersed parts, 410
Hoare, D., elected Member, 221
Hobbs, D. W. *See* Johnston, D. L.
Hoby, T. H., Autopour teeming, 398
Hochmann, J., hardening austenitic steels, 296
Hodgson, C. R., elected Associate, 221
Hoeltje, W. C., and **N. M. Newmark,** brittle strength of structural steel, 290
Hoffman, E., coal preparation, 165
Hoffmann, W., welding rails, 405
Hoffmann, W., and **J. Ruge,** cold pressure welding, 406
Hogaboom, G. B., early electroplating, 286
Holden, J. *See* Hooper, W. H. L.
Holgate, J. E., Yugoslav iron and steel industry, 197
Höll, J., wire-drawing dies, 404

Holland, E., pinholing in enamelled castings, 407
Hollebon, A. B., and **J. F. Finlayson,** instrumental analysis, 413
Hollinghum, J., shell moulding, 275
Holt, J. P., basic refractories, 395
Homès, G. A., and **J. Gouzou,** deformation and rupture research, 190
Homès, G. A., Y. Ots, and **E. Symon,** ultrasonic testing, 87
Homma, F., high-speed steels, 89
Homma, M. *See* Iwase, K.
Homma, M., and **Y. Hashimoto,** carbide formation in white iron, 171
Honda, K., and **M. Satô,** hysteresis in transformations, 192 ; latent heat and transformation, 192 ; specific volumes and transformations, 192
Hood, H. C., impact forging, 177
Hood, T. A., aluminium coating, 287
Hooper, W. H. L., and **J. Holden,** surface study by strain markings, 296
Hopkins, B. E., association of Mo and P, 365 ; temper brittleness, 365 ; biographical note, 160 ; *see also* Allen, N. P., Kubaschewski, O.
Hoppe, W. C., pipemaking, 178
Horger O. J., and **H. R. Neifert,** stresses and fatigue, 291
Horne, C. C., elected Associate, 221
Horner, A., elected Member, 221
Hosti, L. *See* Guérin, H.
Hotop, W., powder metallurgy in permanent-magnet manufacture ; *see also* Kieffer, R.
Houben, K., bentonite sands, 172
Houseman and Thompson, Ltd., *Book:* "Water Treatment," 303
Houston, E. G. *See* Smith, G. V.
Howard, J. C., *Paper:* "Industrial Electric Furnaces." *Discussion,* 251. *Correspondence,* 258. *Author's Reply,* 259
Howard, K. S., and **C. B. Jenni,** sand reclamation, 80
Howard, R. T., heat in welding, 405
Howden, I. A., elected Member, 221
Hoyes, J. *See* Beech, E. H.
Hubert, M., and **G. Gross,** grinding, 275
Hudak, N. M., wire coiler, 404
Hudson, J. C. *See* Fancutt, F.
Huff, G. F., G. B. Bailey, and **J. H. Richards,** oxygen sampling of liquid iron, 299
Huggins, R. A., I. B. Roll, and **H. Udin,** surface-temperature measurement, 282
Hughes, D. *See* Fletcher, S. G.
Hughes, D. J., elected Member, 221
Hughes, D. P., tool-steel bars, 190
Hughes, I. C., effect of magnesium on graphite formation, 171
Hughes, M. L., metallic coatings, 181
Hughes, R. C., spectrochemical analysis, 196
Hülle, H. *See* Becherer, G.
Hulley, R., elected Member, 221
Hulme, C., works traffic, 342
Hulme, P. M. *See* Henderson, H. E.
Humann, A., graphite, 80
Hume, G. J. T., elected Associate, 221
Hume-Rothery, W. *See* Harris, G. B.
Hummitzsch, W., weld blowholes, 406
Humphrey, R., and **R. D. Wasserman,** metallic bonding, 283
Humphreys, H., elected Member, 221
Hundy, B. B., ageing of iron, 345 ; notched-bar test, 365 ; *see also* Backofen, W. A.
Hünlich, R., ore mining, 73
Hunsinger, W. *See* Guthmann, K.
Hunt, M. M., taconite beneficiation, 164
Hunter, R. S., gloss evaluation, 286
Husband, G., elected Member, 221
Hütter, L., arc furnaces, 170 ; basic bricks, 166 ; basic open-hearth roofs, 166 ; magnesite refractories, 397

Igaki, K. *See* Takeuchi, S.
Iguchi, N. *See* Yokota, K.
Iitaka, I., cast-iron diagrams, 412 ; nodular graphite, 399
Iitaka, I., and **K. Abe,** oxide-film crack patterns on cooling iron, 277
Iitaka, I., and **M. Otsuka,** gas evolution from cooling cast iron, 400
Iitaka, I., and **K. Sekiguchi,** acid-resisting silicon steel, 413 ; corrosion of cast iron in dilute acids, 299
Il'ina, V. A., and **V. K. Krivitskaya,** X-ray diffraction from deformed iron, 295
Imberger, F., air compressors, 402
Inoue, A., and **S. Mori,** surface microscopy, 190
Inoui, H. *See* Muromachi, S.
Institute of Welding, *Book:* "Notch Bar Testing and Its Relation to Welded Construction," 199
International Institute of Welding, stress-relief welding, 282
Inukai, T. *See* Yamanouchi, H.
Iofa, Z. A., and **E. I. Lyakhovetskaya,** hydrogen-embrittlement inhibitors mechanism, 285
Ipsen, H. N., and **D. R. Mathews,** controlled atmosphere tempering, 288
Irish, C. R. *See* Rosenberg, S. J.
Isa, S. *See* Tagaya, M.
Ishiwara, T., K. Niwa, and **K. Koizumi,** pyrrhotite roasting, 164 ; pyrrhotite roasting as source of H_2SO_4, 164
Ishiwatari, T. *See* Tanaka, T.
Isobe, M., Fe–Mn–C system, 193
Isobe, M., and **A. Chida,** nodular graphite, 171
Itterbeek, A. van. *See* van Itterbeek, A.
Iturrioz, D., foundry mechanization, 174
Ivantsov, L. M., V. I. Malinina, and **V. V. Polyakova,** steeloscope eyepiece, 300
Iwase, K., and **M. Homma,** cast-iron/oxygen relations, 193

Jack, R. L., geology of Eyre peninsula, 391
Jackson, J. B., elected Associate, 221
Jackson, J. F. B., British Steel Founders' Association Research and Development Division, 275
Jackson, J. H., *See* Blank, H. A.
Jacqué, L. *See* Beaujard, L.
Jacques, W. W., elected Member, 221
Jacquet, P. A., and **A. R. Weill,** temper brittleness, 292
Jaeger, G., and **R. Krasemann,** corrosion of sintered alumina, 76
Jain, S. C. *See* Krishnan, K. S.
Jameson, A. S., boron steels, 175
Jankowski, A., J. Gorczynski, M. Pachowski, A. Bargiel, and **F. Kocur,** nodular-iron production, 275
Jarvis, E., biographical note, 159 ; *see* also Elliot, G. D.
Jastrzebski, K. R., austenite and hardness, 348
Jean, M., cobalt reagents, 92
Jedlička, J. *See* Šícha, F.
Jeffreys, J. T., elected Associate, 221
Jegaden, G. *See* Rocquet, P.
Jehu, L. *See* Cape, G.
Jellinghaus, E., transformation excitation by α-iron, 192
Jellinghaus, W., magnetic testing, 87
Jenkins, D., coke-oven heat losses, 269
Jenkins, H. L., elected Member, 221
Jenkins, R., distortion control in welding, 281
Jenkins, T., elected Member, 221
Jenkins, W. D , biographical note, *facing* 200
Jenkins, W. N., elected Member, 221
Jenkinson, E. A. *See* Herbert, D. C.
Jenni, C. B. *See* Howard, K. S.
Jennings, C. W. *See* Brenner, A.
Jensen, R. S., rail-joint-bar tests, 291
Jensen, W. L. *See* Seens, W. B.
Jessop, H. T., photoelastic analysis, 184
Johansson, B., noise in ore mines, 163
Johnson, M. J. *See* Maxon, W. D.
Johnson, R. N., elected Member, 221
Johnson, W. E. P., fuel use, 269
Johnston, D. L., and **D. W. Hobbs,** strain measurement by electronics, 184
Johnstone, S. T. M. *See* Greenaway, H. T.
Jonassen, F., ship fatigue and fracture, 291
Jones, A., arc-furnace voltage, 259
Jones, D., silica-brick making, 270
Jones, D. J. *see* Pitkin, W. R.
Jones, G. E., elected Member, 221 ; *see also* Gazard, J. S.
Jones, G. P., elected Member, 221
Jones, H. C., elected Member, 221
Jones, H. G., open-hearth roof shape, 387 ; elected Member, 221
Jones, J., elected Member, 221
Jones, J. F. R., slabbing mill, 280
Jones, L. A., elected Member, 221
Jones, P. G. *See* Findley, W. N.
Jones, W. D., powder metallurgy, 290
Jones, W. R. D., and **G. Coombes,** *Paper:* "Effects of Vanadium or Chromium on the Strain Ageing of Rimming Steels," 9
Jordan, G. D., lubrication, 179
Jordeaux, J. *See* Beaujard, L.
Joseph, A. J., elected Member, 221
Josso, E., order–disorder transformation in ternary alloys, 193
Judkins, M. F., electric-spark machining, 289
Jungbluth, H., and **E. Schmidtmann,** deformation recovery of stored steel, 183
Junius, H. M. *See* Keutmann, J.
Jupp, W. B., internal corrosion of tankers, 413
Jura, G., and **C. W. Garland,** MgO surface tension, 76
Juvan, H., gamma radiography, 87

Kaczorowski, S., carbon-rod resistor furnace, 171
Kahles, J. F. *See* Field, M.
Kaindl, K., and **A. Mathiaschitz,** isotope radiography, 188
Kaiser, E. R., boiler dust control, 392
Kalischer, P. R., investment casting, 402
Kalpers, H., clad plate, 288
Kamata, Y., *See* Okamura, T.
Kamenský, R., steel casting in Russia, 80
Kaminskii, E. Z., and **T. I. Stelletskaya,** X-ray camera, 90
Kanayama, H., antimony coating, 287
Kanda, R. *See* Kusakawa, T.
Kane, J. M., and **R. H. Walpole,** dust collectors, 301
Kanie, M. *See* Kusakawa, T.
Kantzer, M., cermets, 182
Karian, G., floating die table for powder compacting, 408
Karius, A., fatigue stresses, 85
Karnisky, B., E. Kinelski, and **E. Gruca,** spot-weld corrosion, 194
Karrer, W., gas turbines, 280
Kashima, T., metal penetration in casting, 402
Katayama, T., magnetostriction, 187
Katz, D. L. *See* Williams, R. B.
Katz, W., chromium diffusion, 286 ; passivation, 412
Kaufman, H. E., blast-furnace operation at U.S. Steel Co., 167
Kaufmann, D. W. *See* Chow, J. G.-Y.
Kaushel, D. D. *See* Paranjpe, V. G.
Kawasaki, T., and **G. Shinoda,** effect of annealing on sheet magnetics, 187
Kay, H. *See* Davis, J. B.
Kayama, N., castings shrinkage, 402 ; cupola hot-blast working 274 ; cupola temperature in relation to castings defects, 402
Kazarnovskii, D. S , recrystallization changes, 297
Keating, D. J., and **B. E. Warren,** X-ray spectrometry, 191
Keech, G., cast-edge tools, 173
Keeler, J. H., and **H. M. Davis,** density and hydrogen occlusion in cold rolling, 294
Keeleric, G. *See* Metzger, L. H.
Keenan, A. G. *See* Mooney, R. W.
Keil, A., and **O. Wüst,** coating-hardness measurement, 84
Keith, M. L., and **O. F. Tuttle,** quartz inversion, 394
Keller, J. D., elected Member, 221
Keller, W. *See* Guthmann, K.

Kelley, J. H., open-hearth firing with coke-oven gas, 78
Kelly, J. B., ship steels, 396
Kelsall, D. F., cyclone study, 163
Kemna, E., crane design, 405
Kendall, C., accident prevention in rolling, 198
Kenmore, H., plated wire, 84
Kenyon, A. F., rolling-mill drives, 404
Kerlin, W. W., bonding clays, 80
Kerr, S. V., elected Member, 221
Ketcham, Sara J. *See* Paige, H.
Keutmann, J., and **H. M. Junius**, continuous annealing furnace, 176
Keyes, F. G., gas-heat conductivities, 87
Khanna, M. N., and **B. R. Nijhawan**, foundry sands, 172
Kieffer, R., and **W. Hotop**, powder extrusion pressing, 182 ; powder metallurgy, 84
Kieffer, R., and **B. Natter**, molybdenum-element furnaces in powder metallurgy, 182
Kienberger, J. P., heat-resisting welding electrodes, 281
Kilpatrick, J. B., elected Member, 221
Kimball, W. A. *See* Barney, J. E.
Kinelski, E. *See* Karnisky, B.
King, A. E., elected Member, 221
King, C. V., **E. Goldschmidt**, and **N. Mayer**, corrosion inhibitors, 194
King, E. G., heats of formation of rhodonite and fayalite, 78 ; elected Associate, 221
King, F. E., thin carbide coatings, 288
Kinner, G., **D. S. Marshall**, and **D. M. Duckworth**, greases, 405
Kinzel, A. B., metallographic advances, 411
Kipp, E. M. *See* Kolarik, I. S.
Kirchberg, H., microscopy of iron ores, 90
Kishimoto, N. *See* Sasaki, N.
Klapheck, W., repair welding, 405
Kleeman, F. S., deoxidation in cupola, 170
Kleingrothaus, W., coal, iron, and chemical industries, 197
Klementaski, S., *Paper:* "Simplified Construction of Heat Balances for the Blast-Furnace Process." 236
Klingenberg, J. J., and **R. A. Papucci**, determination of zirconium, 195
Kloda, R., and **J. Zábrš**, risering, 173
Klose, R., surface preparation, 285
Klyachko, Iu A. *See* Kunin, L. L.
Knaggs, K., elected Associate, 221
Knapp, A. P., lead-clad steels, 287
Knapp, A. S., drawing weaving wire, 279
Knerr, C. H., castings impregnation, 277
Knez, L., pressure welding, 180
Knight, C. *See* Clift, A.
Knight, D. F., Meehanite foundry, 276
Knight, G. M., elected Member, 221
Knight, H. E., electrical engineering in tubemaking, 179 ; elected Member, 221
Knight, J. H., elected Member, 221
Knox, J. D., tube mill, 179
Knüppel, H. *See* Mayer, K.
Knüppel, H., and **K. Mayer**, ageing and composition, 408
Knuth-Winterfeldt, E., elected Member, 221
Knutson, B., lubricants, 281
Ko, T., hardness of martinsitic steels, 350 ; *see also* Cottrell, S. A.; Otte, H. M.
Ko, T., and **S. A. Cottrell**, *Paper:* "The Formation of Bainite." *Discussion*, 347. *Authors' Reply*, 351
Kob, J. *See* Opitz, H.
Kobayashi, T. *See* Masumoto, H.
Koch, A. H., pit furnace, 175
Koch, P., sprayed-metal grain-size, 288
Kochanovska, A., X-ray line multiplication, 90
Kocur, F. *See* Jankowski, A.
Kodenskaya, V. S. *See* Babko, A. K.
Koehler, J. S., dislocation stresses, 290 ; single-crystal imperfections, 192 ; work hardening, 292
Koelzer, H. *See* Beuse, H.
Koeppel, C., coking by-products, 75
Koh, P. K., chi phase, 296
Kohlmeir, O., ore sampling, 391
Kohn, A. *See* Faraggi, H.
Kojima, H., $Fe(CO)_5$ synthesis, 193 ; *see also* Okamura, T.
Koizumi, K. *See* Ishiwara, T.
Kolarik, I. S., **C. A. Zeiler**, and **E. M. Kipp**, lubricants-viscosity effects, 180
Komusaari, H., nickel-plating bath, 286
Konopicky, K., magnesite patents, 166 ; magnesite works, 165 ; *see also* Pranter, H.
Konopicky, K., and **F. Trojer**, magnesite refractories, 166
Kooistra, L. F., **R. U. Blaser**, and **J. T. Tucker**, stress-rupture tests on tubes, 88
Koopman, K. H., welding in jet-engine production, 281
Korbelak, A., and **E. C. Okress**, plating in brazing, 283
Kořínek, V., rolling-mill efficiency, 404
Koritskii, V. G. *See* Vesolovskaya, I. M.
Kornfeld, H., impact strength on ageing, 184
Kornilov, I. I., solubilities in iron, 193
Kostron, H., hardness test, 186
Kotrba, J., radio-isotopes in metallurgy, 278
Kouwenhoven, W. B., and **C. W. Little**, contact resistance welding, 282
Kovacs, A., and **P. Laurent**, elasticity modulus in fatigue, 186 ; fatigue and magnetic properties, 292
Krächter, H., ultrasonic testing of welds, 282
Krainer, H. *See* Kroneis, M.
Krainer, H., and **M. Kroneis**, boron additions, 189
Kramer, H., vermiculite production, 395
Krämer, J., steel colour coding, 89
Krasemann, R. *See* Jaeger, G.
Kratzenstein. *See* Egerer
Krautkrämer, H. *See* Krautkrämer, J.
Krautkrämer, J., and **H. Krautkrämer**, ultrasonic testing, 87
Krebs, W. E., oxygen in iron and steel industry, 283
Krebs, W. E., and **D. J. Ram**, direct iron-making process, 396
Kreulen, D. J. W., Rasa coal, 165
Kreutser, C. *See* Guthmann, K.
Kreutzer, C. *See* Mund, A.
Kriesel, W., determination of Fe, V, and Cr, 92
Krifka, O., and **A. Schoberl**, open-hearth chrome-magnesite bricks, 166
Krisch, A., steel high-temperature behaviour, 293
Krishnan, A. A., iron–zinc powder compacts, 407 ; iron–zinc powder sintering characteristics, 407 ; permanent magnets, 292
Krishnan, K. S., and **S. C. Jain**, thermionic constants of iron group, 87
Krishnaswamy, N. R., inclusions, 398
Krivitskaya, V. K. *See* Il'ina, V. A.
Krivobok, V. N. *See* Muhlenbruch, C. W.
Kröncke, G., and **G. Masing**, polarization of Fe group in electrolytes, 412
Kroneis, M. *See* Krainer, H.
Kroneis, M., **R. Gattringer**, and **H. Krainer**, transformation kinetics in Cr–V steels, 192
Kropka, J. G., multiple moulding, 401
Krueger, H., coke-oven committee, 393
Krug, W., magnetic-testing yokes, 187
Krüger, A., converter steam/oxygen blowing, 78
Krüger, B. *See* Block, E.
Krynicki, P., open-hearth charge calculation, 78
Kubaschewski, O., and **B. E. Hopkins**, *Book:* "Oxidation of Metals and Alloys," 302
Kuczewski, W., **W. Dragan**, and **K. Moszroro**, 167
Kudryumov, G. V., and **M. D. Perkas**, carbides formation in annealing, 297
Kühlwein, F. L., coal preparation, 74
Kühn, C. *See* Paul, H.
Kühnel, R., bearing materials, 83
Kulhánek, F., blast-furnace blowers, 76
Kumpmann, W., gating, 401
Kunin, L. L., and **Iu. A. Klyachko**, surface-tension measurement, 86
Kunitomi, N. *See* Hirone, T.
Kunkler, L. E., aluminizing, 287
Kunz, H., flame cutting, 283
Kunze, E. *See* Scherer, R.
Kuo, K., *Paper:* "Carbide Precipitation, Secondary Hardening, and Red Hardness of High-Speed Steel," 223
Kurdymov, G. V., martensitic transformations, 192
Kurtepov, M. M., and **G. V. Akimov**, corrosion in oxidising solutions, 299
Kurtz, T. *See* Cheng, K. L.
Kurz, A. R., internal-corrosion control in tankers, 413
Kusakawa, T., nodular iron, 399
Kusakawa, T., **R. Kanda**, and **M. Kanie**, nodular iron, 399
Kushner, J. B., plating-bath surface-tension control, 181
Kussmann, A., cold working and precipitation hardening, 409
Kutateladze, K. S. *See* Gamsachhurdia, T. R.
Kuttler, W., enamelling plant, 288
Kuzmick, J. F., hot pressing powder parts, 84
Kwiatkowski, S., moulds, 173

Lafon, J. E., thermal insulation, 271
Lahiri, A. *See* das Gupta, A. K., also Mukherjee, P.
Lahiri, K. C., and **T. N. Basu**, coal ranking by vitrain refraction, 74
Lake, R. A., electric distribution, 264
Lamm, F., patternmaking studies, 401
Landau, R., corrosion by fluorine, 92
Landi, G. R., hydrogen in descaling, 284
Lange, E., synthetic sands, 172
Lange, F., and **W. Brösse**, coke-oven history, 75
Lange, W., determination of sulphur, 93
Langen, M., hot-strip mill, 404
Langenberg, F. C., and **R. D. Stout**, fluidity-test mould, 276
Langers, R., **H. Herbiet**, and **F. Montbrun**, Bessemer-steel properties, 88, 168
Langford, K. E., sulphate determination in plating baths, 196
Lanser, P., fused magnesia, 165
Lanzendörfer, E., exothermic risering compound, 172
Lanzendörfer, E., and **K. Hilterhaus**, cooling agents in casting, 80
Laplace, G. *See* Aubry, G.
LaQue, F. L., corrosion testing, 91
Lareau, J. H., hydroforming jet-engine cups, 279
Larrea, S. G., moulding sands, 80
Larson, F. R., and **J. Miller**, tempering and creep, 88
Larson, H. E., mill rectifiers, 178
Latham, G. H., iron and steel industry expansion, 197
Latour, A., and **J. Schoop**, converter lining by vibrator, 168 ; metal-mixer life, 273
Lauersen, W., iron ores, 268
Laurent, P. *See* Kovacs, A.
Lauterbach, H., sulphides precipitation, 196
Lawrence, R. C., elected Associate, 221
Lawrence, R. F., and **R. L. Tremaine**, arc-furnace flicker control, 397
Lawrence, W. B. *See* Caldwell, D. H.
Lawrie, W. B., foundry dust, 277
Laycock, M. T., elected Member, 221
Lazan, B. J., and **L. J. Demer**, damping, elasticity, and fatigue tests, 85
Leak, G. M. *See* Cottrell, A. H.
Leckie, A. H., arc furnaces, 252 ; open-hearth performance factors, 53
Le Claire, A. D., *Paper:* "Diffusion in Metals," 229
Leder, G., blooming-mill aspects, 404
Ledgard, A. T., blast-furnace practice at Redcar, 271
Lee, M. H., elected Member, 221
Lee-Bird, D. H., scale formation, 279
Lees, J., elected Member, 221
Lefebore, G. J., elected Member, 221

Legrand, C., X-ray testing, 87
LeGrand, R., throatless press, 279
Lehfeldt, W., ultrasonic testing of rails, 410
Leiris, H. de. *See* de Leiris, H.
Leites, A. V., wire testing, 183
Leitgebel, W. *See* Halbach, C. von Bohlen und
Leon, J. A. y de. *See* de Leon, J. A. y
Leppert, G., heat calculations, 74
Le Rolland, P., and **P. Sorin,** rigidity testing, 87
Leroy, P., bath movements in converter model, 168
Lescop, P. *See* Vidal, G.
Le Sech, Y., and **J. Tonachella,** ceramic coatings, 289
Leslie, W. C., aluminium segregation in welded ferrite, 31 ; elected Member, 221
Leushchenko, S. V. *See* Gomberg, M. L.
Levelton, B., corrosion, 297
Leven, M. M., and **M. M. Frocht,** stress-concentration factors, 408
Levesley, A., elected Member, 221
Levick, S. S., elected Member, 221
Lewis, A. S., elected Member, 221
Lewis, G. E., elected Member, 221
Lewis, J. A., polarography, 413
Lewis, K. G., and **W. Milne,** machining, 83, 283
Lex, W., graphite crucibles, 76
Leyensteter, W., quality in turning, 83
Leys, J. A., *Letter:* "A Water-Cooled Pitot Tube for Hot Gases," 228
Leyshon, T. R., elected Member, 221
Leytze, G. A., quenching armour plate, 176
Libsch, J. F. *See* Ananthanarayanan, N. I.
Liégeois, G., elected Member, 221
Ligskii, Iu. D., machined surfaces, 283
Lihl, F. *See* von Schwarz, M.
Likhtman, V. E., and **I. N. Smirnova,** sintering iron/graphite mixtures, 289
Lilleker, W., elected Member, 221
Lillieqvist, G. A., and **C. G. Mickelson,** rare-earth additions to cast steels, 294
Lincke, A., ironmaking in rotary furnace, 77
Lindh, G., and **H. Nathorst,** Swedish stainless steels, 89
Liné, A., descaling, 285
Lines, R., elected Associate, 221
Linhard, M., anaglyph studies, 77
Lips, E. M. H., *See* Fast, J. D.
Litterscheidt, W., coke-oven heating, 75
Little, C. W. *See* Kouwenhoven, W. B.
Littlejohn, R. F. *See* Corbett, P. F.
Llewellyn, D. T., elected Associate, 221
Llewellyn, P. J., elected Member, 221
Lloyd, B. A., elected Associate, 221
Lloyd, F. N. *See* Morrogh, H.
Lockerbie, I., blast-furnace high-top-pressure operation, 395
Loeuille, E., spectroscopy, 87, 92
Logomerac, V. G., elected Member, 221
Löhberg, K., nodular iron, 274
Lomas, J., annealing, 176; spark testing of tool steels, 414
Long, J. V., ceramic coatings, 288
Longenecker, C., taconite beneficiation, 392
Longstreth, W. C., temperature control, 270
Lorant, M., effects of nitrogen, 189 ; tin-plate thickness gauging by X-rays, 287
Lorenzen, G. *See* Stackel, W.
Love, R. A., crankshaft surfacing by hard chrome plating, 181
Lowther, W. H., elected Associate, 221
Lozano, E. P., elected Member, 221
Lucas, A. G. C., oxy-acetylene welding history, 282
Ludwig, D. von. *See* von Ludwig, D.
Luke, C. L., determination of silicon, 299
Lunev, A. F. L., and **G. V. Akimov,** cathodic-protection anodes, 298
Lunn, B., bearing materials, 83
Lüpfert, H., and **E. Gaiser,** structural steels, 89
Lux, F., powder metallurgy in clockmaking, 289
Lyakhovetskaya, E. I. *See* Iofa, Z. A.
Lynch, J. J., stress measurement, 184
Lynn, S., and **D. M. Mason,** determination of chromium, 195
Lynn, W. W. *See* Voss, L. C.
Lysenko, D., steelmaking in Czechoslovakia, 170

Maassen, G., sulphur-impregnated iron-powder bearings, 289
McCabe, L. C., dust collector, 198
MacCarthy, C. P., mining-gear heat-treatment, 278, 403
McCarthy, D. B., elected Member, 221
McComb, J. C., aircraft-steel forging plant, 177 ; crankshaft-forging plant, 177
McConachie, J. *See* Fairfield, H. H.
McDorman, O. N. *See* Schwerdtfeger, W. J.
McDowell, J. S. *See* Custer, J. D.
Mace, E. W., forging tools, 177 ; stripping tools, 82
McElroy, D. L. *See* Frye, J. H., jun.
McFarlane, N. B., alternative chromium sources for stainless steel, 398
McGrandle, J., foundry developments, 170
MacGregor, C. W., transition temperature in fatigue, 292
McGuire, W. J. *See* Bowers, C. N.
Mache, H., flame internal pressure, 392
Macherauch, E. *See* Glocker, R.
Machu, W., phosphate coatings, 195
MacIntosh, R. M., soldering, 283
McIntyre, H. B., cement sands, 400 ; refractory moulds, 80
McKee, J. H., coking coals, 165
McKee, S. A., oil flow in bearings, 179
Mackenzie, I. M. *See* Barr, W.
Mackenzie, J., firebrick-tests correlation, 270
McLaughlan, J., beam rolling, 339
McLean, D., ageing effects, 346 ; temper brittleness, 360
McLennan, J. E., elected Member, 221
McLeod, A., cold-strip mill, 280
McLester, W., works traffic, 341
McLoughlin, J. R., stress relaxometer, 183
McLoughlin, T. J., open-hearth practice, 169
McMullan, D., scanning electron microscope, 190
McMullen, J., electric furnaces, 259
McMurdo, A., elected Member, 221
McNabb, W. M. *See* Reiss, W.
McNeil, D., coal tar, 270
McNeil, J., nodular iron, 79; elected Member, 221
McQuillan. M. K., *See* Greenaway, H. T.
Madsen, I. E., iron and steel industry developments in U.S.A., 396
Maersch, R. E. *See* Groth, W. G.
Magri, D., tellurium cast iron, 171
Magyar, F., gas cleaning, 165
Magyar, F., and **F. Schulz,** cyclone gas cleaners, 393
Maillet and **Couronne,** steel identification by spark, 188
Main, S. A., temper brittleness, 359
Maitra, J. C. *See* Dasgupta, D. R.
Majumber, B. L., refractories specifications, 271
Makiguchi, T., sand binders, 400
Makram, H. *See* Bonnemay, M.
Malcolmson, J., W. Quimby, G. Pingrey, and **J. Oosterhout,** internal-corrosion inhibition in tankers, 413
Malcor, H., research at IRSID, 94
Malenock, P. R. *See* Garofalo, F.
Malinina, V. I. *See* Ivantsov, L. M.
Malinkina, E. I., S. I. Volkov, Z. N. Arkhangel'skaya, and **A. A. Badaeva,** high-speed steels, 295
Malý, V., high-temperature steels, 189
Mandel'shtam, S. L., and **O. B. Fal'kova,** spectrum determination of nitrogen, 300
Manley, H., gamma radiography, 188
Mann, A. J., elected Member, 221
Mann, T., dolomite in steelmaking, 394
Mann, W. L., elected Member, 221
Mannin, J., welding in U.S.S.R., 406
Mano, K. *See* Nagai, K.
Mansa, J. L., and **W. Szybalski,** tuberculation corrosion, 298
Manson, N., flame pressure, 392
Månsson, E. M., obituary notice, 159
Mantel, W., and **W. Schreiber,** determination of sulphur, 93
Mantell, C. L., electrolytic-Mn additions, 189
Marburg, E., ingot solidification, 274
Marinenko, M. P., and **I. S. Shitov,** ore preparation at Magnitogorsk, 269
Marion, F. *See* Aubry, J.
Markland, S. G., elected Member, 221
Marks, H. C., and **N. S. Chamberlin,** chlorine determination in wastes, 300
Markuszewicz, M., and **J. Groycki,** steel magnetic properties, 187
Marpon, R., shot blasting, 284
Marquardt, K., sintering, 182
Marr, F., ore sampling, 391
Marsh, J. S., steelmaking developments in U.S.A., 396
Marsh, P. W., elected Member, 221
Marshall, D. F., *Paper:* "Some Factors Affecting the Operation and Performance of Open-Hearth Furnaces." *Discussion,* 53. *Author's Reply,* 59 ; open-hearth repair and maintenance, 387
Marshall, D. S. *See* Kinner, G.
Marshall, P. R., pore-size measurements, 182
Marshall, S., manganese recovery, 79
Marti, F. B., and **R. S. Acosta,** determination of Mo in Cr–V–Mo steels, 300
Martin, D. H. *See* Bates, L. F.
Martin, G., effect of boron in blackheart malleable, 410 ; gating, 174
Martin, J. C., elected Associate, 221
Martin, W. J. G., elected Member, 221
Martinez, M. S., L. B. del Real, J. de F. y Figueras, and **E. C. Sanchez,** Spanish iron ores, 167
Martinville, J. S. de. *See* de Martinville, J. S.
Marton, S., elected Member, 221
Marunina, A. T. *See* Popel', A. A.
Masin, C. B. *See* Burnett, G. E.
Masing, G., metallography, 90 ; *see also* Kröncke, G.
Maslennikova, M. I., and **Ya. R. Rauzin,** grain-size effect in transformation, 192
Mason, D. M. *See* Lynn, S.
Massa, J. H. *See* Williams, A. C.
Massachusetts Institute of Technology, *Book:* "Fatigue and Fracture of Metals," 95
Massard, M., and **R. Studler,** paint coatings, 407
Masumoto, H., and **H. Saitô,** magnetic properties of Fe–Al alloys, 187 ; rigidity modulus in Fe–Co–Cr alloys, 182
Masumoto, H., H. Saitô, and **T. Kobayashi** Fe–Co–V alloy properties, 183
Masumoto, H., Y. Shirakawa, and **T. Ohara,** magnetic-shunt alloys, 187
Matalin, A. A., and **M. E. Sholina,** profilometer, 284
Mater, L. F. Van. *See* Van Mater, L. F.
Mather, R., award of Bessemer Medal, 220
Mathesius, K., and **H. Bentke,** magnetic-induction crack testing, 188
Mathesius, W., iron and steel production history in U.S.A., 197
Mathews, D. R. *See* Ipsen, H. N.
Mathias, G. E., D. C. crane systems, 179
Mathiaschitz, A. *See* Kaindl, K.
Mathur, G. P. *See* Narayanan, P. I. A.
Matthews, A. J., elected Member, 221
Matuschka, B., European iron and stee industry, 396
Matuyama, E., graphite-distortion study, 191
Maurer, R., rotary-furnace lining, 166
Maw, F. R., biographical note, 390 ; *see also* Nixon, E. W.
Mawhinney, M. H., plating-bath heat transfer, 181
Maxon, W. D., and **M. J. Johnson,** CO_2 determination, 196
Maxwell, R., recuperation, 63
May, E. B., electric distribution, 264

May, J. T., elected Member, 221
Mayer, G., bainite formation, 349 ; biographical note, 71; *see also* Steven, W.
Mayer, J., demonstration foundry, 276
Mayer, K. *See* Knüppel, H.
Mayer, K., H. Knüppel, and **H. J. Därmann,** converter CO_2/O blowing, 77
Mayer, N. *See* King, C. V.
Mayne, C. R. *See* Muhlenbruch, C. W.
Mayne, J. E. O., oxidation of ferrous hydroxide, 406
Mazurzak, W., pickle-bath heating, 285
Meacock, D., elected Member, 221
Meerman, P. G. *See* Visman, J.
Meerman, P. G., and **H. J. Oderkerken,** magnetite sedimentation analysis, 392
Meggitt, E., elected Member, 221
Megill, L. R. *See* Emigh, C. R.
Mehta, P., titanium in steel, 410
Meinecke, E., ore crushers, 392
Meiter, H. G., foundry dust control, 277
Melhardt, H., welding under tension, 405
Mellor, G. F., elected Member, 221
Mendel, L., resurfacing by welding, 283
Menke, W. J., obituary notice, 159
Menon, P. N. K., elected Member, 221
Menter, J. W. *See* Tsou, A. L.
Mera, M. *See* Yoshioka, S.
Merchant, H. J., drop forging, 176
Mercier, A., French blast-furnace, 166
Meredith, W. C. *See* Cousans, F.
Mériel-Bussy, H., French standard steels, 295
Merims, R. *See* Braca, R. M.
Metzger, L. H., and **G. Keeleric,** electrolytic grinding, 406
Meunier, F., desulphurization and dephosphorization by soda slags, 272
Meunier, F., and **A. Demarez,** determination of aluminium nitride, 299 ; determination of nitrogen, 299
Meunier, F., and **R. Soisson,** killing Bessemer steel, 273
Meurer, O., H. Fechner, and **H. Pannek,** bell-type annealing furnace, 176
Meyer, F., elected Member, 221
Meyer, H. H. *See* Tofaute, W.
Michalos, G. P., and **D. J. Girardi,** Syncoat mould wash, 170
Michel, A., heat-resistant alloys, 410
Michel, A. H., and **J. Papier,** rapid annealing, 176
Michell, D. *See* Clarebough, L. M.
Mickelson, C. G. *See* Lillieqvist, G. A.
Micleu, T. *See* Flanigan, A. E.
Midgley, H. G., biographical note, 160 ; *see also* Nurse, R. W.
Miekkoja, H. M., cleavage fracture, 184
Mielentz, W., cracks in bent tubes, 85
Miki, H. *See* Nishihara, T.
Milbauer, M., stress analysis, 290
Miles, D. L., elected Member, 221
Miller, J. *See* Larson, F. R.
Miller, N. C., and **G. H. Tenney,** penetrameter, 410
Miller, O. O. *See* Seens, W. B.
Miller, W. E., electrical mill equipment, 280
Millington, G., elected Member, 221
Milne, A. A. *See* Forrester, P. G.
Milne, W. *See* Lewis, K. G.
Miner, D. C., cold cleaner, 406
Mineur, J., elected Member, 221
Miodownik, A. P., shear in bainite, 350
Mirak'yan, V. M. *See* Balyuk, S. T.
Miskell, F. F. *See* Mitchell, W. jun.
Mitani, Y., low-temperature quenching, 278 ; *see also* Takase, T.
Mitcalfe, J. S., elected Member, 221
Mitchell, J., *Paper:* " From the Ore to the Ingot," 1 ; alloying-metals conservation, 189 ; works traffic, 343 ; biographical note, *frontispiece*
Mitchell, T. E. *See* Elliot, G. D.
Mitchell, W., jun., C. L. Sollenberg, and **F. F. Miskell,** ores heat-treatment, 74
Mitchell, W. I. *See* Findley, W. N.
Mitra, M. S., and **L. R. Vaidyanath,** friction and wear, 409
Mitsche, R., notched-impact test, 183
Mitton, J., all-basic tilting furnace, 396
Miyasawa, R. *See* Yamamoto, M.
Mizikin, V. P. *See* Barinov, N. A.
Modlen, G. F., elected Associate, 221
Moffat, J. S., elected Member, 221
Moffatt, E. M., high-temperature probes, 75
Möhl, K., scrap sampling, 196
Möller, H., radiography, 87
Monma, K., hardening in quenching, 186
Monma, K., S. Uemura, and **M. Hirata,** Ar_3 transformation, 297 ; austenite ageing change, 93
Monoszon, A. I., internal stresses, 290
Montbrun, F. *See* Langers, R.
Mooney, R. W., A. G. Keenan, and **L. A. Wood,** desorption of montmorillomite, 76 ; swelling of montmorillonite, 76
Moore, C. E., firebrick specifications, 271
Morávek, O., and **V. Baborovsky,** inversion casting, 173
Morel, P.-H., refractory silicones, 166
Morgan, H. D., elected Member, 221
Mori, S. *See* Inoue, A.
Mori, T. *See* Sawamura, H.
Moriyama, K. *See* Muromachi, S.
Morlet, E., lost-wax casting of stainless steel blades, 173, 276
Morley, W. A., foundry mechanization, 402
Morren, M., enamel-adhesion determination, 181
Morrison, A. W., Delanium carbon, 270
Morrison, J. F., elected Member, 221
Morrogh, H., F. N. Lloyd, and **W. A. Baker,** foundry research, 398
Mort, J. H., power consumption by cold mills, 280
Mortimer, F., plasticine forging models, 81
Morton, H., elected Member, 221
Morton, R. L., and **P. T. Carter,** refractories attack by liquid steel, 271
Mossiat, H., press guards, 82
Motalik, F. *See* Rapatz, F.
Motlik, K., alloy-elements conservation, 410
Moszroro, K. *See* Kuczewski, W.
Mott, L. H., powders hot coining, 408
Mott, N. F., dislocations, 412 ; strength and creep, 192 ; work hardening of crystals, 186 ; work hardening of metals, 186
Mowat, J., electric furnaces, 256
Mravec, J. G. *See* Alden, J. W.
Muan, A., and **E. F. Osborn,** refractories phases, 76
Mùdry, V., open-hearth practice, 169
Muhlenbruch, C. W., V. N. Krivobok, and **C. R. Mayne,** torsion and Poisson's ratio of stainless steels, 183
Mukherjee, P., N. G. Basak, and **A. Lahiri,** coal moisture, 269
Mulcahy, B. P., cupola charge, 170
Müller, E. A. W., crack detection, 87
Müller, E. W. *See* Drechsler, M.
Mullins, J. E., elected Member, 221
Munch, R. H., instrumentation, 393
Mund, A., and **C. Kreutzer,** *Paper:* " Repair and Maintenance of Open-Hearth Furnaces in Germany," 373. *Discussion*, 382. *Correspondence*, 387. *Authors' Reply*, 388
Mund, W., thermodynamics, 198
Munnix, J., powder metallurgy, 84
Murad, A. B. *See* Carter, P. T.
Muraki, T., Camlachie cramp on chaplets, 401 : Camlachie-cramp studies, 401
Muromachi, S., H. Inoui, and **K. Moriyama,** bending test, 290
Murphy, D. J., research at Frankford Arsenal, 290
Murray, J. C., blast-furnace high-top-pressure operation, 271
Murthy, H. P. S., elected Member, 221
Myskowski, E. T., and **H. F. Bishop,** immersion thermocouples, 393

Nagai, K., and **K. Mano,** electrolytic slide polishing, 191
Nagel, W., wrought-iron work by Kühn, 277
Nakano, M., gas evolution from electric-furnace liquid iron, 277, 402
Nanavati, S. K., blast-furnace design, 395
Nankivell, J. F. *See* Earley, C. C.
Napier, D. H. *See* Arthur, J. R.
Narayanan, P. I. A., and **G. P. Mathur,** ore beneficiation, 74
Narjes, T., reheating-furnace conversion to oil firing, 174
Nash, H., jun., J. R. Hall, H. Y. Allgood. and **J. A. Burnett,** determination of methane, 196
Nathorst, H. *See* Lindh, G.
Natter, B. *See* Kieffer, R.
Naylor, C. E., electropolishing, 285
Neerfeld, H., γ-α transition, 192
Neifert, H. R. *See* Horger, O. J.
Nelson, J. B., coal minerals, 393
Nesbitt, J. D. *See* Coriolis, E. G.
Neth, A., non-destructive testing, 187
Nettlenbusch, L., coking by-products, 75
Netz, H., air dehumidification, 299
Neuenkirchen, H. von. *See* von Neuenkirchen, H.
Neuhaus, A. *See* Feige, W.
Neumann, H., *See* Adamson, O. J.
Neumann, R., elected Member, 221
Newby, M. P., open-hearth burners, 58
Newell, J. G., hydrogen-controlled welding electrodes, 282
Newmark, N. M., fatigue damage, 292 ; *see also* Hoeltje, W. C.
Newton, F. W., elected Member, 221
Nicholls, R. J., elected Member, 221
Nickols, D. G. *See* Tolansky, S.
Nicolas, P., core behaviour 173
Niemann, G., and **K. Banaschek,** sliding friction, 405
Niggemann, H., coal-dust preparation, 75 ; coking with suction, 75
Nijhawan, B. R. *See* Bhatnagar, S. S., *also* Khanna, M. N.; Parthasarathi, M. N.
Niklewski, B. K., and **R. H. Ashby,** silica-free enamels, 181
Niola, V., synthetic sands, 171
Nishihara, T., and **H. Miki,** damping in vibration, 411
Niwa, K. *See* Ishiwara, T.
Nixon, E. W., biographical note, 389
Nixon, E. W., and **F. R. Maw,** *Paper:* " Permeability Tests on Blast-furnace Raw Materials," 331
Nizovtsev, A. A., glass recording pens, 75 ; mould-gas evolution, 80
Norberg, P., Ångermanland foundries, 414
Nore, rolling defects, 178
Norén, T., welding creep-resistant steels, 406 ; welding tool steels, 180
Norton, J. T., fatigue, 291
Novotny, F., rail welding, 83
Nuñez, A. V., brittleness, 292
Nurse, R. W., biographical note, 160
Nurse, R. W., and **H. G. Midgley,** *Paper:* " Studies on the Melilite Solid Solutions." 121
Nutting, J., hardness of aggregates. 350 ; *see also* Tsou, A. L.

O'Brien, R. G., elected Associate, 221
O'Connor, D. T., fluoroscopy, 410
Odaka, R. *See* Okamoto, M.
Oderkerken, H. J. *See* Meerman, P. G.
Oding, G. A., austenite transformations, 297
Oehler, G., presses, 82
Oelsen, W., metal and slag sampling, 396 ; metallurgical research, 197 ; *see also* Springorum, F. A.
Oelsen, W., and **H. J. Därmann,** nitrogen behaviour in converter, 272
Ogan, A. C. *See* Queneau, B. R.
Ogawa, K., wear of carbonitrided steel, 187 ; wear of cast iron, 292
Ogawa, K., and **E. Takeuchi,** wear of carbonitrided steel, 187
Ohara, T. *See* Masumoto, H.
Ohiri, G., metal flow in horizontal mould, 277
Ohtani, M. *See* Sanbongi, K.
Okabayasi, K. *See* Saitô, S.
Okada, M., Ac_1 transformation, 90
Okamoto, H. *See* Sasaki, N.
Okamoto, M., and **R. Odaka,** austenite stabilization, 192

Okamoto, M., and **R. Yoda,** nodular iron, 79 ; nodular graphite, 171
Okamura, T., H. Kojima, and **Y. Kamata,** iron-powder magnetic properties, 182
O'Keefe, P., castings, 171 ; ceramic and enamel coatings, 288 ; new machining methods, 180
Okress, E. C. *See* Korbelak, A.
Okubo, S. *See* Durelli, A. J.
Oldale, H., elected Member, 221
O'Leary, B. J. *See* Donnelly, R. P.
Olmer, P., elected Member, 221
Olson, R., shell-moulding patterns, 401
O'Neill, H. *See* Bish, G. R.
Onishi, I., stainless welds, 83
Oosterhout, J. *See* Malcolmson, J.
Operhall, T., lost-wax castings, 276
Opitz, H., and **J. Kob,** milling with carbide cutters, 283
Orchard, H. G., elected Member, 221
Orchin, M., C. Golumbic, J. E. Anderson, and **H. H. Storch,** coal studies, 165
Ormat, M., MgO from carnallite liquor, 166
Orowan, E., brittleness, 292
Orr, S. D., obituary notice, 71
Ortueta, R. de L., and **E. Y. Garrido,** magnetic materials, 292
Osborn, E. F., *See* Muan, A.
Osterle, F. *See* Charnes, A.
Ots, Y. *See* Homès, G. A.
Otsuka, M., gases evolved in cast-iron solidification, 399 ; *see also* Iitaki, I.
Otte, H. M., and **Ko, T.,** *Paper:* "Thermal Stabilization of Austenite in Carburizing Steels." *Discussion,* 347. *Authors' Reply,* 351
Ottmar, J., bonded metals, 287
Otvos, J. W. *See* Borsoff, V. N.
Owen, W. R., elected Member, 221
Owen, W. S. *See* Hilliard, J. E.

Pachaly, E., oxygen refining in basic electric furnace, 397
Pachowski, M. *See* Jankowski, A.
Paige, H., and **Sara J. Ketcham,** Ti in galvanic corrosion, 298
Paiva, G. De. *See* De Paiva, G.
Palacios, J., and **A. Baptista,** cation-adsorption study by radio-isotopes, 84.
Palmer, S. W., S/Mn ratio in whiteheart malleable, 79
Palmgren, A., roller bearings, 281
Pannek, H. *See* Meurer, O.
Paoloni, A., electric coking, 75
Papier, J., X-ray crystallography of metals, 191 ; *see also* Michel, A. H.
Papucci, R. A. *See* Klingenberg, J. J.
Paranjpe, V. G. *See* Contractor, G. P.
Paranjpe, V. G., and **M. Cohen,** iron–nitrogen system, 412
Paranjpe, V. G., and **D. D. Kaushel,** bainite reaction, 412
Paret, R. E., Cr steel prefabrication, 178
Park, J. R., industrial gases, 198
Parker, A. J. K., elected Member, 221
Parker, F. C., ultrasonic testing, 282
Parker, R., elected Associate, 221
Parkes, A. R., foundry plant, 276 ; stove foundry, 402
Parkins, R. N. *Paper:* "The Stress-Corrosion Cracking of Mild Steels in Nitrate Solution." *Correspondence,* 140, 317
Parks, G. *See* Brading, T.
Parr, J. G., Fe–Mn phases, 91
Parson, G. S., elected Member, 221
Parthasarathi, M. N., and **B. R. Nijhawan,** single-crystal preparation, 191
Parthasarathi, M. N., B. S. Srikantiah, and **B. R. Nijhawan,** nodular graphite, 399
Partington, J. R., thermodynamics, 79
Passolt, H. H., quality control in wire-making, 279
Pateisky, W., strip mill, 178
Pateman, L. W., and **H. S. Peiser,** X-ray study of austenite transformation by fracture, 412
Patton, W. G., bar pointer, 279 ; cast refractories, 394 ; mechanical cleaning of steel strip, 406 ; crankshaft-forging plant, 177
Paul, H., and **C. Kühn,** coal-preparation yield formulæ, 75
Paulson, C. F., waste-liquor treatment by ion exchange, 406
Pawlek, F., brazing, 83
Payne, P. R., *See* Rivers, D.
Paz, J. A. G. de la. *See* de la Paz, J. A. G.
Peacock, G. F. H., dust collection, 198
Peacock, J. A., blooming and billet mill, 280
Pearce, J., elected Associate, 221
Pearce, J. H., and **G. D. Whitehouse,** castings design, 398
Pearse, D. J., thermocouples, 270
Pearson, A., elected Member, 221
Pearson, B. M., cooling in patenting, 82 ; wire for concrete, 89
Pearson, D., electric furnaces, 257
Pearson, F., elected Member, 221
Pease, T. W., elected Member, 221
Peck, P. E., strip-gauge control, 353 ; elected Member, 221
Peiser, H. S. *See* Pateman, L. W.
Pell, R., foundry sand, 172
Pellini, W. S., heat transfer, 398 ; hot tearing, 277 ; *see also* Puzak, P. P.
Pen'lova, E. F., A. M. Dmitrieva, and **P. Ya. Yakovlev,** determination of phosphorus, 92
Pennington, J., and **V. C. Davis,** Minnesota iron sulphide deposits, 392
Penton, H., ceramic coating, 181
Pentz, P. G., foundry resins, 400
Pepper, E. L., elected Member, 221
Pepperhoff, W., and **A. Bähr,** optics of luminous flames, 164
Perkas, M. D. *See* Kudryumov, G. V.
Perry, A. L. H., quenching oils, 176
Perry, C. F., ship-pipeline welding, 282
Perry, D. *See* Delahay, P.
Perry, F. S., elected Member, 221
Perry, H. W., continuous casting, 398 ; flame plating, 84
Pertierra, J. M., metal/slag reactions, 273
Petch, N. J. *Paper:* "The Cleavage Strength of Polycrystals," 25 ; precipitated cementite, 296
Petersen, C., notch effect in bending fatigue, 185
Petersen, G. R., strip gauge control, 178
Petersen, O. M. *See* Prieur, G.
Peterson, E. C., small two-high mills, 404
Peterson, R. E., machine-part fractures, 291
Peterson, W. M., zircon sands, 400
Petit, D., blast-furnace variable-turbulence stoves, 76
Petitfrère, rolling unsolidified ingots, 178 ; segregation in rolling, 178
Petri, R., pickling, 84
Petrman, I., open-hearth slag control, 169
Petržela, L., hardened foundry sands, 171, 173
Peukert, H., plastic coatings, 288
Pevneva, Z. P. *See* Shlyapin, B. P.
Pfau, W. *See* Wickert, K.
Pfeiffer, H. *See* Hauffe, K.
Pfeil, L. B., biographical note, *facing* 304
Phillips, A. H. P., elected Member, 221
Phillips, A. L., cast/weld structures, 405 ; paint spraying, 182
Phillips, C. E., and **A. J. Fenner,** fatigue tests, 86
Phillips, D. J., elected Associate, 221
Phillips, G. P., shell moulding, 174, 276
Phillips, J. R., steelworks power plant, 179
Phipps, G. A., rod and bar mill, 280
Piaskowski, J., Russian literature on malleable iron, 171
Piatti, L., corrosion of rust-resisting steels, 91 ; corrosion of structural materials, 91 ; wetting agents in corrosion, 194
Pickering, F. B., elected Member, 221
Pickton, J. H., elected Member, 221
Pieper, H., foundry-apprentice training, 81
Pigott, E. C., *Book:* "Ferrous Analysis," 415
Pillon, C. F., jun. *See* Delahay, P.
Pingrey, G. *See* Malcolmson, J.
Pinheiro, V. P., elected Member, 221
Pinney, V., elected Associate, 221
Piper, E., and **H. Hagedorn,** mechanical ore sampling, 269
Piret, E. L., ore crushing, 391
Pisarev, V. S., ore beneficiation, 269
Pitkin, W. R., and **D. J. Jones,** powder-metals research, 289
Pitts, J. N., jun., D. D. DeFord, and **G. W. Recktenwald,** gas-analysis manometer, 196
Piwowarksy, E., constructional cast iron, 411 ; foundry rationalization in Germany, 398
Place, J. A., elected Member, 221 ; *see also* Sims, R. B.
Planner, B. P., high-temperature materials, 188
Plateau, J., J. Duflot, and **C. Crussard,** austenite stabilization, 193
Platon, J.-G., *Book:* "Conduite du Haut-Furneau," 415
Pleass, A. C., elected Associate, 221
Pleteneva, N. A., and **G. I. Epifanov,** cutting fluids, 284
Pleva, O., castings and weldments, 180
Plöckinger, E., steelmaking graphs and nomograms, 397
Plowman, D. F., elected Associate, 221
Počta, B., tube drawing, 403
Pogodin-Alekseev, G. I., impact tests, 183
Pohl, E. R. A. *See* Whitelaw, R. B.
Pohl, H., colorimetric determination of sulphur, 92
Pohlman, R., ultrasonic testing, 87
Polak, P. *See* Tochowicz, S.
Polakowski, N. H., cold strip rolling, 355
Polansky, V. S., iron and steel literature review, 301
Pollack, A., cleaning, 84
Polyakova, V. V. *See* Ivantsov, L. M.
Pomp, A., *Book:* "Stahldraht. Siene Herstellung uhd Eigenschaften," 302; annealing strip, 176
Poole, J., elected Member, 221
Popel', A. A., and **A. T. Marunina,** amperometric determination of Zn, 299
Popoff, A. *See* Bastien, P.
Porteous, J., and **P. L. Cotton,** welded-tube production, 405
Pöschl, T., wire drawing, 82
Pottecher, L., airless reduction furnaces, 167
Potter, J. H. *See* Price, T. W.
Pourbaix, M., corrosion research, 194 ; electrochemical properties of metals, 194
Powell, L., elected Member, 221
Powell, R. C., tinplate, 287
Poy, G. L., clear coatings, 407
Pozharitskii, K. L., ore sampling, 269
Pramanik, S., elected Associate, 221
Prange, F. A., embrittlement tests, 91
Pranses, A. L., distortion in heat-treatment, 278
Pranter, H., and **K. Konopicky,** Al_2O_3 determination in refractories, 196
Prause, H., Swedish ore mining, 391
Preece, A., and **R. D. Carter,** *Paper:* "Temper Brittleness of High-Purity Iron-Base Alloys." *Discussion,* 358. *Correspondence,* 365. *Authors' Reply,* 369
Preen, W. von. *See* von Preen, W.
Presnyakov, A. A., and **V. V. Bukin,** rolling dynamometry, 82
Presser, R. *See* Westwood, W.
Prette, M., lost-wax casting, 276
Preuss, R., forging hammers, 81
Prévost, J., lubrication, 281
Přibyl, J., high-pressure risers, 173
Price, J., flame-failure protection, 392
Price, L., crane-practice codes, 179
Price, T. W., and **J. H. Potter,** flame velocities in CO mixtures, 392
Priestley, J. J., sulphur recovery from coal gas, 270 ; *see also* Bondy, H. F.
Prieur, G., and O. M. Petersen, blast-furnace records, 166
Pritchard, A. B., elected Member, 221
Probyn, F. E., maintenance, 198
Prot, M., fatigue testing, 291
Provis, A., open-hearth repair and maintenance, 385

Puchner, O., effect of specimen size in fatigue tests, 85
Pucknell, D. J., elected Associate, 221
Pugh, L. R. P., elected Member, 221
Pullin, V. E., radiography, 87
Pumphrey, W. I., *Letter:* "Identification of Certain Iron–Silicon Carbides," 31; dislocation model, 291; machinability, 406
Püngel, W., welded steels, 411
Pusch, R. *See* Buchholtz, H.
Puzak, P. P., E. W. Eschbacher, and **W. S. Pellini,** brittle fracture in welding, 281
Puzak, P. P., and **W. S. Pellini,** weld imbrittlement, 282

Quarrell, A. G., research techniques, 295
Que, F. L. La. *See* LaQue, F. L.
Queneau, B. R., and **A. C. Ogan,** stainless steel melting practices, 397
Quimby, W. *See* Malcolmson, J.
Quiring, H., Moroccan ores, 73

Rabinowicz, E., surface autoradiography, 191
Rädeker, W., stress-corrosion cracking susceptibility testing, 413
Radtke, F., ore loaders, 73
Raether, H., surface diffraction patterns, 191
Raff, W. H., ore unloading, 391
Rakhmarova, M. S., grinding hardened steels, 283
Ram, D. J. *See* Krebs, W. E.
Ramachandran, E. G., cold-worked steels, 408
Ramanathan, K. G., infra-red absorption by metals, 86
Ramberg, W., elastic-constants panel, 408
Ramsay, J. A., recrystallization, 296
Randall, D. M. E., elected Member, 221
Randle, K. C. *See* Dovey, D. M.
Range, P., ore mining, 73
Rapatz, F., furnace linings, 169
Rapatz, F., and **F. Motalik,** cutting-tool life, 284
Rasmussen, R. T. C., electric-furnace research, 398
Ratner, S. I., and **Iu. S. Danilov,** yield points, 291
Rauzin, Ya. R. *See* Maslennikova, M. I.
Rayden, R. G., electrocleaning lines, 178
Read, W. T., jun., slip lines, 192
Read, W. T., jun., and **W. Shockley,** dislocations geometry, 192; grain-boundary dislocation models, 192
Real, L. B. del. *See* del Real, L. B.
Reardon, A. S., heat-treatment in Australia 403
Recktenwald, G. W. *See* Pitts, J. N., jun.
Reece, T. H., elected Member, 221
Reed, W. S., obituary notice, 389
Reerink, W., oil yield in coking, 75
Rees, R. L., caustic cracking, 298
Rees, W. P., quench-ageing effects, 345; *see also* Allen, N. P.
Reeves, M., paint spraying, 182; wrinkle painting, 288
Regler, F., coating-thickness determination by X-ray back reflection, 181; *see also* von Schwarz, M.
Reichel, F., lacquering, 288
Reinfeld, H., Stürzellberger ironmaking process, 396
Reininger, H., adhesion surfaces, 84; metal spraying, 275; sand re-use, 80
Reiss, W., J. F. Hazel, and **W. M. McNabb,** absorptiometric determination of iron, 195
Reitmeister, W., compressed sand moulds, 400
Remy, G., banded structure, 191
Rendleman, N., and **A. Wilson,** Rendleman rod mill, 404
Renker, H., crane motors, 405
Reuterskiöld, A., foundry costs, 81
Reynolds, R. E., non-destructive tests, 293
Rhodes, J., grinding and polishing, 180
Rhys-Jones, D. C. *See* Bronowski, J.
Rice, H. R., Marmora ore, 268
Rice, J. K., cooling-water treatment, 298
Rice, O. R., American blast-furnaces, 166
Richards, D. G., stress redistribution, 185
Richards, J. H. *See* Huff, G. F.
Richards, J. K., quarry safety, 301
Richards, J. T., elastic-moduli determination, 408
Richards, R. O. *See* Townend, F. S.
Richards, W. C., wire rope, 179
Richardson, H. T., elected Member, 221
Richter, M., Kalahari ores, 73
Rideout, S. P. *See* Das, D. K.
Ridley, F. F., and **W. J. Charlton,** coal-preparation policy, 393
Rietzscher, W., electric feeder heating, 80
Rigbey, J. V., and **C. F. Baxter,** iridium radiography, 410
Rigby, A., elected Member, 221
Rigby, G. R., open-hearth bricks, 271
Rigby, J., X-ray testing, 87
Rigsby, D. L., and **M. J. Waite,** press repair by welding, 282
Riley, R. V., high-silicon iron, 171
Riley, R. V., and **J. Dodd,** welding nodular iron, 282
Ripling, E. J., tube production, 279
Ritchie, R. W., electric furnaces, 253
Ritter, E., and **H. Didier,** oxygen deseaming 79
Rivers, D., and **P. R. Payne,** chromatography fraction cutter, 196
Robert, J. J., machining stainless steel, 284
Roberts, A. L. *See* Grimshaw, R. W.
Roberts, D. N., elected Member, 221
Roberts, J. E., welding bolts, 406
Roberts, M., effect of carbon on austenite and martensite lattices, 296
Roberts, R. R., welding heavy sections, 405
Robertson, A. A. C., elected Member, 221
Robertson, J. M., high-temperature metals, 189
Robertson, W. D., *See* Schlaupitz, H. C.
Robiette, A. G., electric furnaces, 251
Robins, C., elected Associate, 221
Robinson, E. L., rupture strength, 88
Robinson, I. R. *See* Spear, P.
Robinson, S. R., steel-casting moulds, 80
Rochus, R., cavitation, 91
Rocquet, P. steel oxygen/carbon equilibrium, 169
Rocquet, P., and **G. Jegaden,** electropolishing, 285
Roderick, J. W., and **J. Heyman,** beam strain hardening in flexure, 184
Rodes, R. C., fatigue rupture, 85
Rodgers, J. W., arc furnaces, 254
Rodrian, R. H., iron-powder cores, 289
Roe, W. G. H., elected Member, 221
Roedder, E., $K_2O \cdot 2SiO_2$–FeO–SiO_2 system, 394
Roesch, K., gas malleablizing, 79
Rogers, W., elected Member, 221
Rohrbach, Ch. *See* Fink, K.
Rohrmann, A., die sinking, 176
Roitman, I. M. *See* Zaidman, M. E.
Roll, F., castings shrinkage, 277; core-binder microscopy, 401; core-gas measurement, 173; malleable iron, 275; welding malleable iron, 406
Roll, I. B. *See* Huggins, R. A.
Rolland, P. Le. *See* Le Rolland, P.
Roller, A., hot galvanizing, 286
Rolls, T. B., and **E. C. Slater,** *Paper:* "Electric Distribution in Iron and Steel Works." *Discussion*, 260
Roma, F., methane, 165
Romanoff, M. *See* Denison, I. A.
Rooksby, H. P. *See* Willis, B. T. M.
Roos, A., electrolytic pickling, 285
Roques, M., lost-wax casting, 276
Rose, A. *See* Wever, F.
Rose, B., and **J. M. Freeman,** inelastic neutron scattering in iron, 412
Rose, E. R., Avalon ore field, 268
Rose, F., elected Member, 221
Rose, K., high-temperature alloys, 189; shell moulding, 401
Rosenbaum, K., wagon scales, 405
Rosenberg, S. J., and **C. R. Irish,** carbon solubility, 403
Rosenblatt, M. *See* Wilcock, D. F.
Rosenqvist, I. T., diffusion in sandstone, 268
Rosenthal, D., and **C. C. Woolsey, jun.,** strain rate, twinning, and brittle fracture, 185
Ross, H. U., ore beneficiation, 269
Roth, A., mould heat transfer, 81
Rowan, M. J., stamping presses, 279
Rowden, E., waste heat in clay industry, 394
Roxburgh, J., mechanized foundry, 400
Royer, M. B. *See* Buehl, R. C.
Royer, M. B., and **R. C. Buehl,** high-manganese slags from spiegeleisen, 398
Royon, J. *See* Bonnemay, M.
Rozsa, J. T., and **L. E. Zeeb,** spectrochemical excitation of boron, 196
Rückemesser, H., galvanizing thin sheets, 286
Rüdiger, O. *See* Hinnüber, J.
Ruff, H. R., and **H. E. Bellchambers,** inspection lamps, 295
Ruffle, T. W., and **P. M. H. Chawner,** copper-plate migration in carburization, 175
Ruge, J. *See* Hoffmann, W.
Rupp, C. H., elected Member, 221
Russell, J. E., temper brittleness, 359
Rutherford, N. B., zinc recovery in galvanizing, 287; *see also* Fagg, D. N.
Ruttmann, W. *See* Werner, M.
Rydén, S. *See* Carlsson, O.
Rylands, P. K., elected Member, 221
Ryš, P., malleable irons, 79
Rzheznikov, V. S., and **M. A. Babichev,** bearing-stress determination, 83

Sadovskii, V. D. *See* Bogacheva, G. N.
Sagawa, R. *See* Tanaka, T.
Sage, A. M., temper brittleness, 362
Saibel, E. *See* Charnes, A.
Saitô, H. *See* Masumoto, H.
Saitô, S., K. Okabayasi, and **T. Tanaka,** wear of nodular iron, 292
Sakai, H., and **H. Sugaya,** hacksaw blades, 284
Salauze, J., cleaning in plating, 84
Salz, L., wire-drawing lubricants, 279
Samuel, G. A., chromizing, 286
Samuel, P., ageing effects, 346; bainite formation, 347
Sanbongi, K., and **M. Ohtani,** silicon equilibrium measurement, 167
Sandelands, A., elected Associate, 221
Sander, H.-R., and **M. Hempel,** mild-steel deformation study, 190
Sanders, C. A., clay strength, 80; moulding sands, 400
Sanders, C. A., and **A. G. Clem,** sand ram test, 172
Sanderson, L., corrosion-resistant steels. 294
Sandoz, G. *See* Stauss, H. E.
Sanyal, B. K., elected Member, 221
Sanz, N. P. A., watt losses in Si steels, 294
Sapir, A. D., reagent for Ni, 300
Saporte, R. *See* Fert, C.
Sarcander, E., Finnish metal industries, 93; Swedish ore and metal industries, 93
Šárek, J., blast-furnace coke consumption. 77; blast moisture, 76
Sargeant, M. J., shell moulding, 174
Sarjant, R. J., air pollution in iron and steel industry, 198; fluidization, 269
Sarnecki, M., snap-flask moulding, 173
Sasaki, N., N. Kishimoto, R. Ueda, T. Koroda, and **H. Okamoto,** steel microstructure electron-microscope study, 191
Sato, H., superlattice of multi-component alloys, 193; superlattice of primary alloys, 193
Satô, K. *See* Watanabe, M.
Satô, M. *See* Honda, K.
Sato, T. *See* Suguwara, S.
Sauermann, A., mine gases, 165
Sauermann, W., gas cleaning, 270
Saunders, C. T., iron and steel consumption in Britain, 301
Sautereau, E., strain gauges, 290

Savage, R. E., health safeguards, in nodular-iron production, 400
Savas, J., elected Member, 221
Sawamura, H., eutectic-graphite castings, 411
Sawamura, H., and **T. Mori,** Fe–As–C system, 412
Scanlan, F., elected Member, 221
Schaefer, F. C., and **R. L. Burdsall,** heat-treating line, 175
Schäffeler, G. *See* Wiegand, H.
Schaffer, O., and **W. Feldmann,** electrostatic tube spraying 288
Schairer, J. F., and **K. Yagi,** $FeO–Al_2O_3–SiO_2$ system, 394
Scharffenberg, E., roll casting, 81
Schauff, E., sheet and strip, 294
Schaus, R. A., galvanizing, 286
Scheil, M. A., stress corrosion in Cr–Ni steels, 218
Scherer, R., elected Member, 221
Scherer, R., K. Bungardt, and **E. Kunze,** boron as alloying element, 88
Schery, K. *See* Steiner, J.
Scheunemann, F., west European iron and steel industry, 301
Schiebe, G. *See* Hendrick, H.
Schiffers, H., lubrication electrochemistry, 180
Schikorr, G., corrosion dependencies, 91: corrosion by wrapping paper, 413
Schinn, R., testing rotor forgings, 294
Schlaupitz, H. C., and **W. D. Robertson,** electroplate-adhesion assessment, 181
Schleissner, J. *See* Clas, G.
Schleppi, O., grinding machines, 284
Schlichter, H. G., steel-foundry modernization, 275
Schlüter, H. *See* Tofaute, W.
Schmid, D. M., wire-mill layout, 404
Schmidt, W. J., Basören chromite resources, 268
Schmidtmann, E. *See* Jungbluth, E.
Schnurmann, R., friction, 409
Schoberl, A. *See* Krifka, O.
Schoop, J. *See* Eilender, W., *also* Latour, A.
Schrader, A., and **F. Wever,** electron microscopy, 190
Schreiber, W. *See* Bühler, H., *also* Mantel, W.
Schreiner, L. A. *See* Epifanov, G. I.
Schröder, G., ore loader, 74
Schroeder, J. W., seamless pipe, 279
Schroeder, W., iron-powder parts, 182
Schubert, H. R., early steel, 197
Schulz, E. H., ferrous metallurgy, 294
Schulz, E. H., and **P. Bornefeld,** early iron, 93
Schulz, F. *See* Magyar, F.
Schulze, A., and **H. Eicke,** electrical behaviour of thin metal layers, 410
Schumacher, H., low-shaft blast-furnace, 271
Schumacher, J. S., sand mixture, 172
Schürmann, H. M. E., and **W. Schutz,** Moroccan ores, 73
Schutz, W. *See* Schürmann, H. M. E.
Schwalbe, R., testing metal powders, 289
Schwartz, B., refractories failure, 271
Schwarz, C. V., oxygen injection for low-nitrogen electric steel, 168
Schwarz, E., producer gas, 165
Schwarz, M. von. *See* von Schwarz, M.
Schwarz-Bergkampf, E., and **W. Unger,** electric furnaces, 273
Schwellenbach, H., ore concentration, 74
Schwerdtfeger, W. J., and **O. N. McDorman,** cathodic protection, 298 ; corrosion-rate measurement, 194
Scorer, S. D., water-tube corrosion, 298
Scott-Maxwell, I. S. M. *See* Evans, R. W.
Scratchley, P. J., elected Member, 221
Seabrook, D., elected Member, 221
Sealey, E., elected Member, 221
Sech, Y. Le. *See* Le Sech, Y.
Seelmeyer, G., central-heating processes, 195 ; corrosion prevention, 299
Seeman, H. J., ultrasonic testing, 87
Seens, W. B., W. L. Jensen, and **O. O. Miller,** notch toughness of Charpy specimens, 183
Seitz, F., crystal imperfections, 192
Sejournet, J., extrusion, 178, 404
Sekiguchi, K. *See* Iitaka, I.
Sellner, F., low-frequency induction furnaces, 397
Sen, H., elected Member, 221
Sen, P. K., elected Member, 221
Senfter, E., blast-furnace efficiencies, 167
Senftle, F. E. *See* Gaudin, A. M.
Sengfelder, G., ore pelletizing, 164
Senior, D. A., elected Member, 221
Sevin, R., foundry laboratory at Sèvres, 277 ; Moroccan foundry, 276
Shackell, K. K., and **J. H. Welsh,** beams plastic flexure, 183
Shafer, W. M., powder cores, 290
Shashkin, M. A., reagent for Mg ion, 92
Shaw, M. C., tool-wear test, 406
Shepherd, A. E., elected Member, 221
Sherman, M., thin strip, 411
Sherston-Baker (Sir) Humphrey, elected Member, 221
Sheshunoff, V. *See* Whitfield, M. G.
Shields, B. M., J. Chipman, and **N. J. Grant,** determination of hydrogen in steel, 300
Shinoda, G. *See* Kawasaki, T.
Shirakawa, Y. *See* Masumoto, H.
Shirley, H. T., *Paper:* "Microstructural Characteristics of Acid Corrosion in 18% Cr, 8–14% Ni, 3% Mo Steels," 242
Shirokov, V. I., microphotometer stand, 295
Shitov, I. S. *See* Marinenko, M. P.
Shlyapin, B. P., and **Z. P. Pevneva,** determination of chromium, 92
Shockley, W. *See* Read, W. T., jun.
Sholina, M. E. *See* Matalin, A. A.
Shotts, R. Q., coal swelling, 165
Shrikhande, K. Y. *See* das Gupta, A. K.
Shriver, G. L., electropolishing, 180
Šicha, F., and **J. Jedlička,** welding high-pressure fittings, 180
Sidebottom, O. M. *See* Elsesser, T. M.
Siegel, H., steel treatment with electric-furnace slag, 169
Siepmann, H., iron-powder reduction, 289
Signora, M., and **J. Camolese,** ingot surface defects, 274
Sigov, I. V., bending fatigue, 291
Silman, H., electroplating, 181
Silva, L. C. C. da. *See* da Silva, L. C. C.
Silver, R. S., combustion in fuel beds, 392
Simon, F. E., fuel thermodynamics, 392
Simon, G., electric furnaces, 78
Simpkinson. T. V., carbides in Nb-stabilized stainless steel, 297 ; ferrite gauge, 411
Simpson, A. V., elected Member, 221
Sims, R. B., *Paper:* "Performance of Hydrodynamically Lubricated Roll-Neck Bearings." *Discussion,* 353. *Correspondence,* 355. *Author's Reply,* 356 ; forward slip in rolling, 179 ; *see also* Hessenberg, W. C. F.
Sims, R. B., and **D. F. Arthur,** *Paper:* "Speed-Dependent Variables in Cold Strip Rolling." *Discussion,* 353. *Correspondence,* 355. *Authors' Reply,* 356
Sims, R. B., and **J. A. Place,** surface-temperature pyrometer, 270
Sims, R. B., J. A. Place, and **P. R. A. Briggs,** *Paper:* "Control of Strip Thickness in Cold Rolling by Varying the Applied Tensions." *Discussion,* 353. *Correspondence,* 355. *Authors' Reply,* 356 ; *Paper:* "Works Trial of the 'T' Method of Automatic Gauge Control." *Discussion,* 353. *Correspondence,* 355. *Authors' Reply,* 356
Sindelář, V., liquid-metal temperature measurement, 76
Singer, A. R. E., technical control, 198
Sioda, H., foundry mechanization, 174
Sippell, K. W., flame cleaning, 84
Sistiaga, J. M., weld-metal properties, 281
Skalla, N., effect of alkalis on open-hearth refractories, 396
Skinner, C., elected Associate, 221
Skinner, J., elected Associate, 221
Slack, K. H., strip-gauge control, 354
Slade, F. H., furnaces, 166
Slade, R. H., elected Member, 221
Sladek, R. J. *See* Dijkstra, L. J.
Slater, E. C., elected Member, 221 ; *see also* Rolls, T. B.
Sloman, H. A. *See* Evans, Ll.
Smalley, H. F., and **R. B. Sosman,** pyrometric-cone furnaces, 395
Smeets, L. *See* Beuken, L.
Smellie, T. T., elected Member, 221
Smet, G. de. *See* de Smet, G.
Smiltens, J., magnetite single crystals, 191
Smirnova, I. N. *See* Likhtman, V. E.
Smit, J. A., flame photometry, 164
Smith, B. M., metals comparator, 410
Smith, C. S., interphase interfaces, 192
Smith, C. S., and **L. Guttman,** internal-boundary measurement, 296
Smith, E. D., elected Associate, 221
Smith, F. T., babbitt-metal bonding to grey iron, 287
Smith, G. C. *See* Austin, G. W.
Smith, G. V. *See* Dulis, E. J., *also* Garofalo, F.
Smith, G. V., E. J. Dulis, and **E. G. Houston,** creep-rupture of sheet 88
Smith, H. H., notch ductility, 290
Smith, J. E. M., elected Associate, 221
Smith, J. F., powder equipment at Abbey 404
Smith, J. L., elected Member, 221
Smith, K. M., foundry practice, 276 ; moulding machines, 401
Smith, M. D., elected Associate, 221
Smith, N., elected Member, 221
Smith, R., personnel relations, 301 ; silicon steels, 189
Smith, R. A., *Paper:* "Line-Broadening of Martensite in Nickel Steels." *Discussion,* 347
Smith, S. F., strain gauges, 184
Smoluchowski, R., grain-boundary phenomena, 192 ; shear stresses, 296
Snook, H. W., spinning and pressing, 82
Snow, R. B., and **W. C. Allen,** blast-furnace lining, 271
Snyder, E. P., open-hearth bricks, 395
Snyder, W. A., olivine sands, 275
Society of Automotive Engineers, shot-peening manual, 290
Soete, W., stress and fracture, 408
Soisson, R. *See* Meunier, F.
Sokolov, L. D., and **N. A. Chelyshev,** friction in compression, 183
Soliman, S. M., elected Member, 221
Sollenberg, C. L. *See* Mitchell, W., jun.
Söllner, M., casting defects, 81
Somigli, G., casting techniques of da Vinci, 197 ; *see also* Catelani, A.
Sommer, H., coke economy, 170
Sommer, W. J., foundry quality control, 277, 402
Sorin, P. *See* Le Rolland, P.
Sørum, H., crystal-structure Patterson analysis, 296
Sosman, R. B. *See* Smalley, H. F.
Sousa, A. de. *See* de Sousa, A.
Spangler, F. L., heat-treating in steam, 403
Spare, G. T., high-temperature creep of steel wires, 293
Sparham, G. A., award of Ablett Prize, 220; *see also* Burke, S. A.
Späth, W., cutting tests, 284 ; films and hardness, 86 ; friction and fatigue, 185 ; wear, 292
Spear, P., I. R. Robinson, and **K. J. B. Wolfe,** drill steels, 284
Speirs, J. D., car-body preparation for painting, 285
Speith, K. G. *See* Springorum, F. A.
Speith, K. G., and **H. Bücken,** low-nitrogen Bessemer-steel production, 168
Speith, K. G., and **A. Bungeroth,** Junghaus continuous-casting process, 274
Speith, K. G., and **H. vom Ende,** sampling liquid-steel baths, 78
Spence, W., strip-gauge control, 354
Spencer, H. F., elected Member, 221
Spicer, F., barrel finishing, 285 ; drying plated parts, 285
Splinder, B., induction melting, 80

Splittgerber, A., blade corrosion in H_2SO_4, 195
Spratt, H. P., first iron steamer, 197
Springorum, F. A., K. G. Speith, and **W. Oelsen,** oxygen blowing in converter, 168
Sprunck, A., Luxemburg metal-industry history, 197
Srikantiah, B. S. *See* Parthasarathi, M. N.
Stäckel, W., and **G. Lorenzen,** coke-oven gas-collecting chambers, 75
Stagg, R. F., elected Member, 221
Stam, W. Van. *See* Van Stam, W.
Stamford, M. S., elected Member, 221
Stammbach, rail production, 178
Stang, F. H., Borneo minerals, 73
Stansbury, E. E. *See* Frye, J. H., jun.
Starns, H. J., cast-iron pipes, 174
Starr, J., casting resin, 173
Staton, R., elected Member, 221
Stauss, H. E., and **G. Sandoz,** magnetostriction by magnetic anneal, 409
Stebel, O. *See* Guthmann, K.
Steele, J. H., rolls, 179
Steele, O. S., arc-furnace regulators, 254
Steghart, F., elected Member, 221
Steimetz, alloy identification, 188
Steinberg, W., F. A. Georgen, and **T. Heuss,** centenary of Hüttenwerke Phoenix, 197
Steinberger, A. W., and **J. Stoop,** microcracking of aircraft steels, 294
Steinebach, F. G., malleable-iron foundry, 80
Steiner, H., iron and steel combines, 93
Steiner, J., and **K. Schery,** effect of shields on plating-bath metal distribution, 84 ; effect of shields on plating-bath throwing power, 84
Stelletskaya, T. I. *See* Kaminskii, E. Z.
Stephens, J. V., elected Member, 221
Steven, W., biographical note, 71
Steven, W., and **G. Mayer,** *Paper:* "Continuous-Cooling Transformation Diagrams of steels," 33
Stevens, R. Y., elected Member, 221
Stevenson, W. W., refractories, 395
Stieler, A., electrostatic beneficiation, 74
Stock, L. G., elected Member, 221
Stock, S. H., elected Member, 221
Stockmeyer, F. W., castings solidification, 277
Stoop, J. *See* Steinberger, A. W.
Storch, H. H. *See* Orchin, M.
Stout, R. D. *See* Langenberg, F. C.
Stratford, W. H., casting large ingots, 78
Streatfield, E. L., boiler-water treatment, 298
Streicher, M. A., etching test for intergranular corrosion, 413
Strickland-Constable, R. F., two-phase equilibrium, 193
Studler, R. *See* Massard, M.
Suffolk, S. F. *See* Burton, H.
Sugaya, H. *See* Sakai, H.
Sugg, R. E., surface interferometry, 284
Suguwara, S., and **T. Sato,** heat transfer on flat-plate surface, 277
Sullivan, G. F., shell-moulded valves, 173
Sutton, H. G., hobs, 284
Světnička, F. *See* Budinský, F.
Swift, H. W. *See* Chung, S. Y.
Swift, W. A. C., elected Member, 221
Swings, P., spectrographic grating, 196
Sy, A. De. *See* De Sy, A.
Sy, A.-L. de. *See* de Sy, A.-L.
Sykes, C., alloy steels, 294
Sykora, M., surface decarburization, 411
Symington, R., and **J. Hamilton,** Simcar coal washer, 269
Symon, E. *See* Homès, G. A.
Szybalski, W. *See* Mansa, H. L.

Tabor, D., rolling friction, 186
Taft, E. *See* Apker, L.
Taganov, K. I., metal-coating thickness determination, 286
Tagaya, M., and **S. Isa,** rust formation, 91
Tagaya, M., and **I. Tamura,** quenching oils, 176 ; quenching with water, 176
Tahir, S. *See* Carter, P. T.
Taira, S. *See* Tishihara, N.
Takahashi, Y., sintering, 164
Takamoto, and **Y. Tanabe,** A.C. electropolishing, 180
Takase, T., and **Y. Mitani,** induction surface hardening, 175
Takei, H. *See* Yamamoto, H.
Takeuchi, E., *See* Ogawa, K.
Takeuchi, S. and **K. Igaki,** wüstite equilibria, 170
Talbot, B. C., rolling broad-flange beams, 339
Tamura, I. *See* Tagaya, M.
Tanabe, Y., electron-microscopy replicas, 295 ; *see also* Takamoto, N.
Tanaka, A., A.C. electropolishing, 180
Tanaka, M., deformation in contact surfaces, 184 ; *see also* Ueda, T.
Tanaka, S., and **S. Yamada,** plate-thickness determination by ultrasonics, 188
Tanaka, T. *See* Saitô, S.
Tanaka, T., T. Ishiwatari, and **R. Sagawa,** nodular iron, 171
Tator, K., organic coatings, 194 ; protective painting, 182
Taylor, A. W., elected Member, 221
Taylor, B., bolts fatigue strength, 291
Taylor, E. H., sand handling, 174
Taylor, E. W., microscopes, 90
Taylor, J., developments in ironmaking, 395
Taylor, J., and **J. D. Gilchrist,** blast-furnace coke, 167
Taylor, J. L., elected Associate, 221
Taylor, L. S. *See* Wyckoff, H. O.
Taylor, R. D., cathodic protection, 298
Taylor, R. I., cupola charge indicator, 399
Taylor, R. R., rolling-mill lubrication, 404
Teague, B. C., elected Member, 221
Teed, P. L., metallurgical problems of stratospheric flight, 294 ; structure and fatigue, 292
Tegelhütter, H., malleablizing furnaces, 79
Tejera, P. A. de. *See* de Tejera, P. A.
Tekht, V. P. *See* Glikman, L. A.
Templin, R. L., design for fatigue, 291
Tenney, G. H. *See* Miller, N. C.
Terlecki, E., scale in reheating, 174
Terry, J. G., metals conservation, 189
Tertsch, H., hardness, 409 ; hardness-tests anisotropy, 409
Testro, H. J., cleaning for painting, 285
Theis, E., austempering steels, 295
Theis, K., suggestion scheme, 198
Thielsch, H., and **J. R. Charlton.** bonding resin, 282
Thierry, P., blast-furnace instrumentation, 396
Thomas, G. B., *Paper:* "Developments in the Rolling of Broad Flange Beams at the Cargo Fleet Iron Co., Ltd." *Discussion,* 339. *Author's Reply,* 340
Thomas, P. B., elected Associate, 221
Thomas, S. O. L., elected Member, 221
Thomas, W. E., non-destructive testing, 293
Thomas, W. J., elected Member, 221
Thompson, M. H., fatigue cracks in hoist drums, 186
Thompson, N., electric distribution, 260
Thompson, S. P., elected Associate, 221
Thomson, A. G., British steel industry and railways, 94 ; silicosis 81 ; strip gauge control, 179
Thomson, N. D., resistor furnace, 258
Thornton, D. R., elected Member, 221
Thornton, P. C., elected Member, 221
Thring, M. W., flame-radiation research, 74 ; recuperation, 68
Thurlow, G. G., test-probe for flue gases, 297
Tideström, C. W., Lanacashire wrought-iron process, 396
Tiedemann, O., drawing reductions, 82
Tilley, F., oxidation-rate effect on malleable-iron graphitization, 171
Timmins, G. H., open-hearth burning-down, 386
Tinley, E. L., plate bending, 179
Tipler, H. R. *See* Allen, N. P.
Tipper, A., foundry sand, 171
Tipper, C. F., notch-bar tests, 408
Tishihara, N., and **S. Taira,** bar yielding in torsion, 290
Titze, W., all-basic Maerz furnace, 396
Tochowicz, S., L. Andrejev, and **P. Polak,** open-hearth slag control, 169
Tödt, F., films measurement, 91
Tofaute, W., H. Schlüter, and **H. H. Meyer,** transformer and dynamo sheets, 86
Tolansky, S., and **D. G. Nickols,** hardness-test indentations, 186
Tomaszczyk, W., and **Z. Borysowski,** relaxation and creep testing, 189
Tomba, N. C., X-ray camera, 190
Tomlinson, R. C., and **A. H. Edwards,** dish-size effect in ash determination, 300
Tomlinson, R. C., and **D. A. Hall,** coal-analysis tolerances, 414
Tomono, Y., magnetic after-effect, 86
Tonachella, J. *See* Le Sech, Y.
Tonkin, S. M., early Rastrick foundry, 414
Torgeson, D. R. *See* Crookston, J. A.
Tottle, L. G., diamond-dust polishing, 295
Towler, F. H., and **J. M. Towler,** press control valves, 279
Towler, J. M. *See* Towler, F. H.
Townend, F. S., and R. O Richards, cooling water in coking, 269
Trägårdh, U., friction in bearings, 281
Tranter, G. D., Armco plant, 168
Trapl, J., gas in steels, 410
Traustel, S., blast-furnace models, 395
Treby, W. C., elected Member, 221
Treffner, W., active-MgO studies, 394
Tremaine, R. L. *See* Lawrence, R. F.
Trent, E. M., carbide-tool wear, 283
Treseder, R. S. *See* Fraser, J. P.
Trethewey, D., elected Member, 221
Treuting, R. G., residual stresses, 184
Trevithick, T. H., patterns, 174
Trigger, K. J. *See* Chao, B. T.
Trojer, F., magnesite thermal-shock study, 166 ; open-hearth slag-basicity determination, 169
Trommer, W., steel founding, 275 ; *see also* Gries, H.
Troost, A., fatigue-test study, 185 ; stress study, 184
Trost, A., crack detection, 87
Trümpelmann, E., coal flotation, 74
Tsou, A. L., J. Nutting, and **J. W. Menter,** *Paper:* "The Quench Ageing of Iron." *Discussion,* 344. *Authors' Reply,* 346
Tsutsumi, N., austenitic malleable iron, 411 ; nodular-iron structure, 399
Tsuwa, H., lapping, 283
Tucker, J. T. *See* Kooistra, L. F.
Tufnail, H. R., elected Member, 221
Tufts, C. F., surface-study methods, 190
Turkdogan, E. T., award of Carnegie Medal, 220
Turner, C. A., jun., and **S. L. Yarborough,** fast gas annealing, 278
Turner, D. R., nickel plating, 286
Turner, N. H., recuperators, 66
Turner, S. B., elected Member, 221
Turpin, G. *See* Aubrey, J.
Tuttle, H. C., crankshaft-forging plant, 177; plastic drawing dies, 177 ; press-scrap baling, 177
Tuttle, O. F. *See* Davis, G. L., *also* Keith, M. L.
Tyberg, B., hot-blast cupola, 399
Tyler, E. S., annealing, 403
Tyszko, Z., cupolas in U.S.S.R., 170

Uchida, S., charcoal semi-water gas, 175 ; charcoal semi-water gas reaction with steel, 175 ; charcoal semi-water gas reactions with steel and sulphur, 175
Udin, H. *See* Huggins, R. A.
Ueda, R. *See* Sasaki, N.
Ueda, S., chromizing, 407
Ueda, T., and **M. Tanaka,** fatigue study by magnetics, 186
Uemura, S. *See* Monma, K.
Uhleen, A. E., precoated coiled strip, 407
Uhlig, H. H., corrosion research, 193
Uhlmann, W., boron carbide in lapping, 283
Ulitin, W. N., electric-spark grinding, 180

Ulmer, G., recirculation in foundry stoves, 173 ; stress-relief furnace, 81
Ulmer, R. C., and **J. W. Wood,** corrosion by cooling water, 298
Unger, W. *See* Schwarz-Bergkampf, E.
Ungoed, W. P., elected Member, 221
Usatenko, Iu. I., and **P. A. Bulakhova,** decomposition of silicates, 93

Vaidyanath, L. R. *See* Mitra, M. S.
Vaidyanathan, K. S., high-speed steels, 273
Vallette, R., deformation, 184
Valter, J., welding clad plate, 83
van Ahlen, A., coke-oven-gas desulphurization, 75 ; *see also* Gröbner, W.
Van Camp, G., induction heating, 175
van den Bergh, A. W. J., structure and hardening, 296
van der Veen, J. H., brittle-fracture tests, 408
Vaney, F. D. De. *See* DeVaney, F. D.
van Itterbeek, A., films current sensitivity, 86
Van Mater, L. F., heating steel, 174
Van Stam, W. *See* Zuithoff, A. J.
Vanstone, A. G., elected Member, 221
Varela, M. T., low-temperature properties, 88
Varfolomeev, N. M., and **I. P. Belyaenko,** isotope container, 87
Varskaya, A. K. *See* Arkharov, V. I.
Vaswani, A. T. *See* Chakrabarti, N. G.
Vaupel, O., non-destructive testing, 188
Väyrynen, H. *See* Grubitsch, H.
Veen, J. H. van der. *See* van der Veen, J. H.
Vereins Deutscher Eisenhüttenleute, *Book:* "Druck- Zug- und Mengenmessung," 95
Verse, H., X-ray films, 90 ; X-ray tube voltage, 90
Veselovskaya, I. M., V. G. Koritskii, and **L. N. Filimonov,** carbon electrodes in spectrum analysis, 299
Vickers, W., elected Associate, 221
Victory, F. C., contour grinding, 83
Vidal, G., and **P. Lescop,** sound velocity in decomposition states, 296
Villner, L., shell moulding, 401 ; *see also* Broberg, J.
Vincent, E. T., stressed-castings design, 274
Visconti, Y. S., montmorillonite clays, 270
Visman, J., quality control in coal preparation, 269
Visman, J., and **P. G. Meerman,** coal sampling, 165
Viswanathan, S., steels identification, 300
Vodička, F., electric-spark hardening and machining, 180
Voice, E. W., S. H. Brooks, and **P. K. Gledhill,** *Paper:* "The Permeability of Sinter Beds," 136
Volkov, S. I. *See* Malinkina, E. I.
Vollers, C. *See* Goosens, H. C.
Volodin, E. I., profilometer, 284
vom Ende, H. *See* Fischer, W. A., *also* Speith, K. G.
Vonada, E. E., mill generators, 179
von Eichborn, J. L., wetting of metals, 194
Vonfeld, J. M. *See* Hanson, V. D.
von Neuenkirchen, H., pressure welding, 180
von Preen, W., cupola stack height, 399
von Schwarz, M., F. Regler, and **F. Lihl,** X-ray techniques, 90
von Ludwig, D. *See* Wood, R. L.
Voss, L. C., and **W. W. Lynn,** coloured core sands, 172

Wagenknecht, W. E., wire annealing, 411 ; wire properties, 190
Wagner, G. *See* Wiest, P.
Wagner, H. W., grinding, 275
Wahl, L. *See* Coche, L.
Wahlberg, T., and **L. Fredholm,** brick/steel reactions, 394
Wahlberg, T., and **N. Winblad,** Söderberg electrodes, 78
Waite, M. J. *See* Rigsby, D. L.
Walde, H., low-shaft furnace, 77
Walden, J. F., elected Member, 221
Walker, I. G. F., elected Member, 221
Walker, W. S., cold-metal-shop productivity factors, 273
Wallace, W. P. *See* Williman, A.
Wallmann, K., continuous-mill trains, 404
Walmsley, R. G., elected Member, 221
Walpole, R. H. *See* Kane, J. M.
Walter, A., coatings testing, 286
Walter, L., automatic furnace control, 167; boiler-plant control rooms, 393 ; instrument panels, 301
Walters, F. M., obituary notice, 266
Walters, N. E , crack detection, 188
Walters, W. S., shell moulding, 276
Walton, C. F., risering, 401
Walton, D. F., elected Member, 221
Ward, P. T., elected Member, 221
Warren, B. E. *See* Keating, D. J.
Warren, B. E., and **B. L. Averbach,** cold-work X-ray studies, 192
Warren, W. G., weld fatigue tests, 409
Warring, R. H., abrasive finishing, 180 ; refrigeration of parts, 88 ; super refractories, 271 ; vacuum deposition, 407
Warshaw, H. D., combustion-pressure gauge, 164
Wassermann, G. D., heat conduction, 393
Wasserman, R. D. *See* Humphrey, R.
Watanabe, J. *See* Yamamoto, M.
Watanabe, M., and **K. Sato,** weld stresses, 83
Waters, F. O., soil resistivity, 298
Waterton, F. W., X-rays for welds, 188
Watkin, E. R. S., *Paper:* "Railway Traffic of the Appleby-Frodingham Steel Works." *Discussion,* 341. *Author's Reply,* 344
Watson, T. T., clad plate, 407
Watts, A. B., and **H. Ford,** strip yielding between dies, 177
Waugh, P. W., elected Member, 221
Weaver, W. R., quality control, 397
Webster, R., sand reclamation, 80
Weibull, W., fatigue failures, 292
Weill, A. R., plastic deformation, 85 ; *see also* Jacquet, P. A.
Weir, C. D., caustic cracking, 298
Weise, F. E., A.C.S.R. wire, 280
Weisman, W. I., pickle-bath heating, 285
Weiss, K. R. *See* Woodcock, F. J.
Welch, W. P., and **B. Cametti,** shaft torsion hysteresis, 183
Weldon, J. W., elected Member, 221
Welsh, J. H. *See* Shackell, K. K.
Wendt, O., railway welding, 405
Wenk, S. A., non-destructive testing, 188
Wens, C., blast-furnace coke consumption, 77
Wentworth, R. P., and **H. C. Campbell,** weld-metal temper brittleness, 281
Werking, L. C., formed carbon, 270
Werner, J. K. *See* Ewing, D. T.
Werner, M., and **W. Ruttmann,** corrosion, 91
Werthebach, P., welding-electrode testing, 282
West, G. W. *See* Clarebough, L. M.
West, T. S., analysis developments, 413
Westrope, A. R., elected Associate, 221
Westwood, W., and **R. Presser,** analysis of nodular iron, 92
Wetterau, H. B., blast-furnace recorders, 270
Wever, F. *See* Schrader, A.
Wever, F., and **A. Rose,** bainite transformation, 349
Whalen, W. D., machine-tool lubrication, 83
White, A. E., high-temperature metals, 293 ; *see also* Freeman, J. W.
White, J. *See* Clark, P. W.
White, J. S. *See* Bloom, F. K.
White, J. V., sand testing, 172
White, W. H., grinding-dust control, 277
Whitehouse, G. D. *See* Pearce, J. H.
Whitelaw, R. B., and **E. R. A. Pohl,** nodular iron, 399
Whitfield, M. G., and **V. Sheshunoff,** aluminized coatings, 287
Whittaker, A., quality control in finishing, 286
Wickerham, W. R., A.C. crane systems, 179
Wickert, K., and **H. Wiehr,** zinc–iron cell, 195
Wickert, K., H. Wiehr, and **W. Pfau,** Evans-cells studies, 194
Wiederholt, W., protective coatings, 194
Wiegand, H., and **G. Schäffeler,** cylinder-liner wear resistance, 86
Wiehe, A. E. *See* Bowers, C. N.
Wiehr, H. *See* Wickert, K.
Wiest, P., and **G. Wagner,** machinability testing, 406
Wilcock, D. F., and **M. Rosenblatt,** oil flow in bearings, 180
Wild, R., *Paper:* "The Chemical Constitution of Sinters," 131
Wile, L. E., sand reclamation, 400
Wilhelm, R. H., fluidized beds, 392
Wilkinson, H. C., mining steels, 411
Williams, A., elected Member, 221
Williams, A. C., and **J. H. Massa,** investment castings, 402
Williams, A. E., electron diffraction, 89 ; plate-thickness determination by ultrasonics, 188 ; wire ropes, 89, 190
Williams, C. H., soaking-pit recuperators, 64
Williams, D. C., sand hot strength, 400
Williams, H., elected Member, 221
Williams, R. B., and **D. L. Katz,** heat-exchanger tubes, 74
Williams, W. J., mottled iron, 79
Williamson, G. K., Geiger counters in X-ray work, 296
Williman, A., and **W. P. Wallace,** piercing, 178
Willis, B. T. M., and **H. P. Rooksby,** hematite crystal structure, 412
Willmer, T. K., spectrographic analysis, 196
Willners, H., alloying elements, 396
Wilson, A. *See* Rendleman, N.
Wilson, A. R., flame hardening and tempering of card wire, 403
Wilson, F. A., elected Member, 221
Wilson, G. R., mill drives at Abbey, 404
Wilson, R., plate inspection by ultrasonics, 293
Wilson, W. H., elected Member, 221
Winblad, N. *See* Wahlberg, T.
Winkler, K., X-ray laboratory, 90
Winning, H., elected Member, 221
Winter, H., and **A. Flamm,** coke grinding, 393
Winterbottom, A. B., turbine-blade corrosion, 299
Wire Industry, Ltd., *Book:* "The Wire Industry Encyclopaedic Handbook, 95
Wishart, H. B., stress states, 185
Wislicenus, W. *See* Guthmann, K.
Wistreich, J. G., drawing theory, 82
Withers, P., elected Member, 221
Witkowski, T., steel casting, 80
Wittmoser, A., nodular graphite, 275
Wogin, R., open-hearth repair and maintenance, 384
Wogrinz, A., bath-current yields, 84
Wolf, E. F., electrolytic corrosion, 412
Wolfe, K. J. B. *See* Spear, P.
Wolock, I. *See* Ekhaus, S.
Wood, A. A. R., determination of chromium, 300
Wood, F. J., shell cupping and drawing, 177
Wood, G., elected Member, 221
Wood, G. S., elected Member, 221
Wood, J. W. *See* Ulmer, R. C.
Wood, L. A. *See* Mooney, R. W.
Wood, R., stretch forming, 404
Wood, R. L., and **D. von Ludwig,** *Book:* "Investment Castings for Engineers," 303
Wood, W. A. *See* Bullen, F. P.
Woodcock, F. J., and **K. R. Weiss,** post-yield strain measurement, 184
Woodcock, F. S., elected Member, 221
Woodcock, R., elected Member, 221

Woodfine, B. C., *Paper:* "Some Aspects of Temper Brittleness." *Discussion,* 358. *Author's Reply,* 367; *Paper:* "Temper Brittleness—A Critical Review of the Literature. *Discussion,* 358. *Author's Reply,* 367
Woodhead, A. B., elected Associate, 221
Woody, G. V., taconite pelletization, 392
Woolsey, C. C., jun. *See* Rosenthal, D.
Work, H. K., research at Universities, 301
Wormwell, F. *See* Farrer, T. W.
Wrazej, W. T., scaling of iron, 299
Wright, E. W., coking practice, 269
Wright, P. *See* Elson, A.
Wright, R. H., A.C. drives, 405
Wright, R. J., X-rays, 187
Wuppermann, A. T., strip-thickness measurement, 86
Wusatowski, R. *See* Wusatowski, Z.
Wusatowski, Z., and **R. Wusatowski,** metal flow in rolling, 178
Wüst, O. *See* Keil, A.
Wüster, R., ore-fine filters, 74
Wyble, D. O. *See* Bacon, L. O.
Wyckoff, H. O., and **L. S. Taylor,** X-ray protection, 187
Wyss, T., frequency effect on fatigue tests, 409

Yagi, K. *See* Schairer, J. F.
Yagihashi, T., H_2O/H/Fe reaction in steelmaking, 169
Yajima, E., Al diffusion in steel, 287
Yokota, K., and **N. Iguchi,** transformation on rapid heating, 412
Yakovlev, P. Ya. *See* Pen'lova, E. F.
Yakovleva, M. N., microscope illuminator, 90
Yamada, S. *See* Tanaka, S.
Yamamoto, H., and **H. Takei,** rigidity changes in annealing and cold drawing, 182
Yamamoto, M., and **R. Miyasawa,** Fe single-crystal production by recrystallization, 192; Fe–Al single-crystal production by strain annealing, 192
Yamamoto, M., and **J. Watanabe,** iron single-crystal light figures, 191
Yamanouchi, H., and **I. Hayashi,** drawing-die deformation, 403
Yamanouchi, H., and **T. Inukai,** etching for fatigue metallography, 409
Yarborough, S. L. *See* Turner, C. A., jun.
Yerville, J. d'. *See* d'Yerville, J.
Yoda, R. *See* Okamoto, M.
Yokota, K., liquid-metal flow, 401
Yoshioka, S., and **M. Mera,** electron-diffraction grinding, 191
Young, D. H., welding electrodes, 282
Yudenich, G. I., and **Z. S. Bogdanova,** ore flotation, 269

Zábrš, J. *See* Kloda, R.
Zaidman, M. E., and **I. M. Roitman,** welded-joint study, 180
Zajceva, A. I. *See* Fredov, V. N.
Zeeb, L. E. *See* Rozsa, J. T.
Zehnder, F. J. *See* Bremmer, F. H.
Zeiler, C. A. *See* Kolarik, I. S.
Zemantowsky, Mary T., synthetic sands, 400
Zener, C., diffusion theory, 192
Zentner, V. *See* Brenner, A.
Zeppernick, R. G., foundry standardization, 81
Zhakovskaya, I. S. *See* Davidenkov, N. N.
Zhukovin, E. I., testing springs, 89
Zhuravlev, V. A. *See* Davidenkov, N. N.
Zhuravleva, M. G. *See* Arkharov, V. I.
Zietlin, A., heavy presses, 177
Ziliani, G., foundry-sand testing, 171
Ziliani, G., and **G. Grungo,** open-hearth roofs, 169
Zimmer, K.-O., ladle bricks, 395
Zimmermann, M., determination of Ti, 300
Zimnawoda, H. W., sand handling, 172
Zlatin, N. *See* Field, M.
Zoja, R., Cr_2O_3–FeO–SiO_2 system, 394
Zucker, M., and **G. Cubitt-Smith,** magnetic-force welding, 281
Zuithoff, A. J., and **W. Van Stam,** core baking, 275
Zuliani, G., Lubatti ironmaking process, 272